Presented by:

Thomas A. Farrell, M.D.

1976

SERIAL

MEDICAL LIBRARY

The

Mary Imogene Bassett Hospital

COOPERSTOWN, N. Y. 13326

Title Eye, ear, nose and throat

Vol. 1916 (V. III)

Access. No. 23657

Mary Imogene Bassett Hospital Library

76961
(20)

NODULAR TUBERCULOUS EPISCLERITIS. (GAMBLE)

THE

Practical Medicine Series

COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

UNDER THE GENERAL EDITORIAL CHARGE OF

CHARLES L. MIX, A. M., M. D.

PROFESSOR OF PHYSICAL DIAGNOSIS IN THE NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

VOLUME III

The Eye, Ear, Nose and Throat

EDITED BY

CASEY A. WOOD, C. M., M. D., D. C. L.

ALBERT H. ANDREWS, M. D.

GEORGE E. SHAMBAUGH, M. D.

SERIES 1916

CHICAGO
THE YEAR BOOK PUBLISHERS
327 S. La Salle Street

Copyright 1916
By
THE YEAR BOOK PUBLISHERS

DEPARTMENTS

The Eye

CASEY A. WOOD, C. M., M. D., D. C. L.

Professor of Ophthalmology and Head of the Department, College of Medicine, University of Illinois; Consulting Ophthalmologist of Cook County Hospital; Attending Ophthalmic Surgeon, St. Luke's Hospital, Chicago.

The Ear

ALBERT H. ANDREWS, M. D.

Professor of Otology, Rhinology and Laryngology in the Chicago Policlinic; Oculist and Aurist to the Chicago, Rock Island & Pacific Railway, etc.

The Nose and Throat

GEORGE E. SHAMBAUGH, M. D.

Professor of Otology and Laryngology, Rush Medical College; Otologist of the Presbyterian Hospital.

Mary Imogene Bassett Hospital Library

23657

Digitized by the Internet Archive
in 2026

https://archive.org/details/practicalmedicin0003unse_a8a8

TABLE OF CONTENTS.

THE EYE.

Preface 7
Examination of the Eye 9-22
Refraction and Accommodation 22-26
Hygiene and Economics of the Eye 26-38
Color Vision 38
Bacteriology of the Eye 39-42
Ocular Parasites 39-42
Diseases of the Eyelids 42-48
Diseases of the Conjunctiva 48-53
Diseases of the Cornea and Sclera 53-61
The Crystalline Lens 61-74
Cataract 61-74
Diseases of the Uveal Tract and Vitreous 74-91
Diseases of the Lachrymal Apparatus 91-95
Retina and Optic Nerve 95-118
Toxic Amblyopia 118-119
The Ocular Muscles 119-121
Orbit and Eyeball 121-129
Enucleation 121-127
Orbital Tumors 127-129
Glaucoma 129-139
Injuries of the Eye 139-148
Military Surgery of the Eye 148-163
General Diseases and Ocular Symptoms 163-172
Ocular Relations of the Neighboring Sinuses 172-177
New Ophthalmic Instruments 178-183
Ocular Therapeutics 183-188

THE EAR.

Introduction 190
General Considerations 190-195
Deafness 195-204
Middle Ear 204-243
Otitis Media 210-216
Mastoid and Sinus Involvement 216-236
Other Complications and Sequels of Otitis Media 236-243
Internal Ear 243-255

THE NOSE AND THROAT.

DISEASES OF THE NOSE 259-305
Hay Fever 277-279
The Septum 279-284
The Sinuses 284-305

DISEASES OF THE THROAT 305-359

The Mouth 305-313
The Tongue 313-316
The Pharynx 316-319
The Tonsils 319-335
The Esophagus 335-337
Tuberculous Glands 337-339
Sore Throat 339-341
Diphtheria 341-345
The Trachea and Bronchi 346-347
Thyroglossal Duct 347
The Larynx 347-356
Stammering 356-359

PREFACE.

As in other departments of medicine the output of ophthalmic literature during 1915 has been much reduced and modified by the world war. Naturally, much of this literature has been in the shape of reports on military subjects; injuries to the ocular apparatus have, it is everywhere noticed, been exceedingly common owing to the prevalence of trench warfare and the extensive use of shrapnel and other high explosives. A special chapter in the present volume of this Series is devoted to that subject. On the other hand, while ophthalmologists of belligerent countries have been able to devote less time and energy to their usual work there has been a sensible increase in American contributions to ophthalmology. These latter papers, monographs, etc., deal with the ordinary topics, especially with the relation of *focal infections* to eye diseases—in particular with intra-ocular affections as a possible result of tonsillar, dental and intestinal toxemias.

As in previous volumes, the Editor desires to acknowledge his indebtedness to the admirable abstracts published in *Ophthalmology,* and his sincere thanks are accordingly due to Dr. H. V. Würdemann and his efficient corps of collaborators for permission to make use of them.

CASEY WOOD.

DISEASES OF THE EYE.

EXAMINATION OF THE EYE

Visible Currents in the Anterior Chamber. On focal illumination with the Nernst lamp and an aplanatic lens of cases of iritis and iridocyclitis with slight opacities of the aqueous, F. Berg[1] noted a current of exuded particles, in the posterior portions of the anterior chamber upward, in the anterior portions downward. This, he thinks, is due to difference of temperature between the iris and the cornea. The warmer iris heats the fluid which becomes specifically lighter; consequently it rises, while near the colder cornea the fluid, by losing heat, grows heavier and sinks. The current always follows gravitation, *e. g.,* if the patient lies on the side, it is vertically from above downward in the horizontal meridian of the eye. If the eye is covered by the crystal of a watch and the space between them filled with water of the temperature of the body, the current ceases, as now the anterior and posterior walls of the anterior chamber have about the same temperature. The current is most marked in patients after cataract extraction, on account of the greater depth of the anterior chamber.

Berg doubts the correctness of Türk's explanations of the triangular arrangement of precipitates on the posterior surface of the cornea in "serous iritis." He ascribes it to a probable effect of gravitation and centrifugal force. As is well known, Fuchs attributes the triangular form to the movements of the eye, by which the precipitates are thrown against the cornea. He compares the process to the throwing of gravel through a screen or shaking grain in a sieve. Here the stones or grains always gather in a heap with an apex (which contains the smallest particles) upward, while larger ones successively accumulate downward.

(1) Klin. Monatsbl., f. Augenheilk., 55, p. 61, 1915.

The Wassermann Reaction in Ophthalmic Practice. W. H. Manson, T. J. Mackie and H. E. Smith[2] lay stress on the well-recognized facts that the positive results of the Wassermann reaction are of great value, and that the conclusions to be drawn from negative results are less definite. The writers furnish a report on the examination of 250 ophthalmic cases. In the tertiary and latent stages of syphilis, only 75 per cent. and 50 per cent. respectively, yield a positive result. In interstitial keratitis, the reaction was positive in 88.8 per cent. In strumous keratitis, the results were negative in all. In iritis and iridocyclitis, these cases were obtained in two series: twenty-two in the first group gave twelve positive and ten negative results. In the second group of twenty-eight cases, fifteen were positive, twelve negative, and one doubtful. Three cases of cyclitis, uncomplicated, were negative. In choroiditis, of twenty-six cases, five gave positive and twenty negative results, while one was doubtful. Four cases of sympathetic ophthalmitis gave negative results, as also did three cases of retinitis pigmentosa. Five cases of retinal detachment gave negative results. In inflammation of the optic nerve and retina, only five positive cases were obtained out of a total of fourteen. In optic atrophy, of twenty-one cases, 57 per cent. gave positive results, and it is interesting to note that ten diagnosed as primary optic atrophy were all positive. The thirteen cases of paralysis of the ocular muscles gave seven positive results, of which four were in paralysis of the third nerve. All six negative results were in paralysis of the sixth nerve. One case of dacryocystitis out of three gave a positive reaction. Six cases of myopia with choroiditis were examined. Two gave a positive reaction. Four cases of glaucoma were examined, with one positive result. It is interesting to note that out of the total number of cases of various diseases examined, 50 per cent. gave a positive reaction.

The Cord Perimeter. A cheap pocket instrument for exact examinations of the visual field. This instrument is described by S. Holth.[3] It consists of two rulers of wood, each 25 cm. long, united by a joint. If placed at right angles they form the cords of two quadrants, on

(2) British Med. Jour., Feb. 20, 1915.
(3) Klin. Monatsbl. f. Augenheilk., 53, p. 197.

which the degrees are projected and marked. On each ruler at 45° a metal rod is fastened at a right angle. Both meet in a joint under a right angle. This joint is placed on the lower orbital margin.

A Tangent Curtain. The reader is referred to the original description of this device invented by A. Duane.[4] He uses it: (1) To delimit central and para central scotomata and enlargements of the blind spot; (2) to delimit the field of vision; (3) to plot the field of fixation; (4) to plot diplopia and the field of double vision.

The author claims accuracy, simplicity, thoroughness, and rapidity.

A Modification of the Wilbrand Prism Test. In order to examine hemianopic cases as accurately as possible for the presence of the Wilbrand prism phenomena, a rather elaborate instrument about five feet in diameter was built by Clifford Walker[5] and electrically equipped to perform the test without the use of prisms. Small flash lights concealed in various parts of the inner surface of a large umbrella were controlled from a switchboard of about the size of an ordinary field chart so that a spot of light could be made to appear or disappear in practically any part of the field while the movements of the patient's eye were observed.

About twenty-six cases were observed, including both anterior and posterior lesions. In general, it was found that the results bore a relation to the position of the lesion only in so far as the lesion influenced the character of the field defect and the mentality or powers of observation of the patient. Thus, patients with homonymous hemianopsia of anterior or posterior origin were apt to refix the test object on the blind side more rapidly than those with bitemporal hemianopsia, evidently because the former had learned by experience to deviate the eyes in one direction to find an object lost from view, whereas the latter had not acquired such experience, since the nasal field of one eye supplied the lost temporal field of the other eye. In practically all cases, of whatever origin, it was found that the patient would perform

---

(4) Arch. Ophthal., 43, p. 591.
(5) Arch. Ophthal., March, 1915; abstracted in Ann. Ophthal., July, 1915.

the act of refixation as the center light disappeared, even when there was no light in the blind field. This was called "pseudo-refixation." Likewise, all cases had a decided tendency to perform "angular refixation"; that is, the eye would move out toward the blind field where the light last appeared, and then up or down until the light was refixed in its real position.

Thus it was concluded that while the test might be of some value in studying the mentality of the patient from a psychiatric standpoint, it was of no value in determining the position of a lesion by virtue of the presence of a definite reflex arc. Walker's conclusions include the following facts and suggestions:

1. The distribution of field defects in anterior and posterior lesions encourages psychologic factors, which greatly complicate the Wilbrand test.

2. The tendency to decrease the reaction time on repetition; the presence of seeking movements of the eye at all times during refixation; the presence of pseudo-refixation, angular refixation, pseudo-angular refixation; the tendency to central refixation, and pseudo-central refixation, all invalidate the Wilbrand test as a topical diagnostic reflex.

3. The results obtained by the Wilbrand test are surely a measure of certain processes of observation, memory, and thought, and are not an indication of the integrity of a definite reflex arc.

4. The possibility that this method of examination may be useful to the psychiatrist and thereby, perhaps, contribute to topical diagnosis, is suggested.

New Test Objects for the Scientific Demonstration of the Visual Acuity. M. Straub[6] is among those who believe that greater accuracy can be obtained with Landolt's rings, with their differences of one-tenth, than with Snellen type. Physiologists have never been friends of the letters. They prefer as a test the greatest distance at which the space between two points can be distinguished. One calls the visual acuity the form sense, the power to distinguish form with the eye; but the ophthalmologist can not use the double point; it is too monotonous.

(6) Tyds. v. Geneesk., Sept. 19, 1914.

While the visual acuity is called the form sense or space sense of the retina, it is rather the direction sense of the visual organ. Space has three dimensions, but the visual acuity gives us only two dimensions, because it does not give the distance, but only the direction of the observed points. The visual acuity gives us *difference* of direction. The visual acuity is the power to appreciate differences of direction through the visual organ. When we examine the visual acuity with the double point it depends on the angular distance of the points. It follows from this that the visual acuity can be examined with an object, which limits two bordering directions without intervening space: two confluent points or a small bar. The greatest distance at which such a small bar can be recognized is the distance where it touches two contiguous directions. As the simplest form, the small bar is to be preferred to the double point. Straub has constructed types where bars in four directions are replaced by points, and which contain the same amount of black as the bars. The patient is expected to say whether a point or bar is shown, and, if it is a bar, its direction. Of course, the measurements of the bars only are used for determination of the visual acuity. The points serve only for control. The difference can be measured by the decimal scale. These charts are very valuable for certain examinations, but not for daily use, as the fixation of such small objects is difficult and fatiguing. One of the advantages of the larger letters is in their easier fixation.

As Straub wished to retain the bar as a foundation for a practical test object, he changed the well-known letters of Snellen. He collected ten types of equal value to the general form of the Snellen letters. These also can be made in decimal intervals, as follows:

The principal objection to these figures is the greater exertion they entail upon both examiner and examined. For daily practice the letters are to be preferred.

The Limitations of the Tonometer. The *Series* for 1914 gave (p. 10, Vol. III) an account of the experience

of Harrison Butler with this instrument. Priestley Smith[7] now calls attention to the fact that there are other factors besides intra-ocular pressure which influence the impressibility of the eyeball and hence the accuracy of the readings with the tonometer; these factors are the size and structure of the eyeball. Eyes with the same pressure will sometimes give different readings and eyes with different pressures will at times give the identical readings.

He puts and answers the questions: (1) With what degree of accuracy can we measure the impressibility of the eye? (2) With what degree of accuracy does the impressibility indicate the intra-ocular pressure? He conducted a series of experiments chiefly on human eyes postmortem, but also on excised eyes of sheep and bullocks. He demonstrates that the reliability of the readings taken with the tonometer of Schiötz depend greatly on the position of the instrument—whether this was exactly on the summit of the cornea and perfectly vertical; he gives diagrams showing the correct position and also several possible faulty positions of the eye and instrument and illustrates how each of these vitiates the results of the readings.

He contends that in recording the tonometric observation, the reading and not the supposed equivalent should be given; the former is fact but the latter is an inference and this inference may be more or less correct. He criticizes the statement that the pressure in healthy eyes varies from 13 to 27 mm. of mercury as being most unlikely since it implies that the pressure of the intra-ocular fluid and that of the blood in the retinal and uveal veins is twice as great in some eyes as in others within normal limits. Since we find that the pressure in different normal eyes seems to differ by 8 or more mm. of mercury as measured by the tonometer and yet know that in reality there is no difference in pressure whatever, we are certainly justified in doubting the inference above alluded to.

In his own words: "We are told that when the tonometer indicates an intra-ocular pressure of more than 27 mm. Hg., the presence of glaucoma should be sus-

(7) Ophthal. Rev., March, 1915.

pected; also that glaucoma may co-exist with a pressure of 21 or 22 mm. Hg. These are inferences. If we want the facts we must re-translate the figures. *Then* the statements are that a reading smaller than 2.5 should be regarded as a danger signal, and that glaucoma may be present even with a reading of 4. These data, if confirmed, are very valuable; the original statements are dubious pathology. No doubt some eyes are damaged by degrees of pressure that others can tolerate with impunity, but the tonometer can not tell us what these risky pressures are.''

He is careful to indicate that he does not regard the tonometer as a useful instrument; though the Schiötz tonometer can not measure *absolute pressure*, it can indicate *change of pressure* with great precision. Applied to the same eye at different times, *e. g.*, before and after an operation, before and after the use of a certain drug, at different hours of day or night, and so forth, it can give invaluable aid in determining the occurrence of pressure changes when these are doubtful. Again, as between the two eyes of the same person, when these are presumably alike in structure, it may be relied on to detect with certainty a *difference of pressure* much smaller than is discoverable by the finger.

The smallest difference which the tonometer can be relied upon to detect depends on the skill of the operator and the amenability of the patient. However, even with the limitations necessary on account of the influence of structural differences in eyes, the tonometer is far more trustworthy than the finger as an index to the intra-ocular pressure, for its limitations apply also to the finger test, and it has no prejudices. To emphasize the importance of recording readings and not supposed equivalents, he points out that Schiötz himself has set the example of so doing. The chart is valuable as showing approximately the average value of any given reading, but not as a guide to the actual value in an individual case. This article is not an attack on the Schiötz tonometer, but rather a defence of an admirable instrument against demands with which no instrument can possibly comply.

[The Editor, while impressed with the value and importance of the tonometer and while using it as a routine

procedure in the examination of the eyes of his patients, believes that we ought to continue to exercise the *tactus eruditus* and not to neglect the valuable information obtainable from the finger-tip method.]

A New Hand Campimeter. In describing this instrument L. C. Peter[8] points out its advantages as well as its limitations. To overcome objections and to increase the scientific value of the campimeter, the hand campimeter of the writer in its present form was devised.

It consists of a blackboard fourteen inches square, to the bottom of which is attached a metal quadrant of a circle with a radius of six and a half inches, or approximately one-sixth of a meter. The upper end of the quadrant is shaped to the lower eyelid and cheek, and is directly opposite the central point of fixation on the board. The instrument is supported by a handle, and is easily held in position by the patient.

One of the objections to the average campimeter is the great number of lines on the board on the side on which the examination is made, or the inconvenience, for example, of taking readings from the back of the board. These are overcome, or reduced to a minimum by the very light tracing of the lines, as shown in the photograph and chart. After numerous experiments, lines as charted have been found sufficient for the most careful examination of the central field, and not so conspicuous as to be distracting to the patient.

The circles are drawn with mathematical accuracy. The radius of each circle is obtained by multiplying the natural tangent of each angle desired (ten, twenty, thirty, forty, and fifty degrees) by the radius of the arc (six and a half inches, or sixteen centimeters).

A feature not observed by the writer on any other campimeter is the charting of the normal blind spot of Marriotte. After studies of a number of cases, Peter finds the average normal blind spot of Marriotte to be twenty-one millimeters long and fifteen millimeters wide, at a distance of six and a half inches, or seven degrees by five degrees. The blind spot is also placed at the average distance from the point of fixation of thirteen and five-tenths degrees. Deviations from these measure-

(8) Ophthal. Rec., p. 331, July, 1915.

(a) New hand campimeter.— Peter (see page 16).

(b) Self-illuminated Berger loupe.— Shumway (see page 21).

PLATE I.

ments are very slight in the normal individual, the greatest number of variations being in the vertical diameter—this diameter in some instances being only five degrees. By means of this charting of the average normal blind spot, departure from the normal is quickly and accurately noted.

The test object is a small black disc on which is placed the color under examination, which is readily attached to or detached from a thin black rod. Within the twenty degree circle a test object of two mm. in diameter is found to be best adapted, whereas a five degree mm. disc is the best size for studies beyond the twentieth degree.

The instrument is so light in weight that the examination can be made near a window with the best daylight obtainable, and when not in use it may be packed into a small space and is quite portable. (Plate Ia.)

The general objection to any tangent curtain or campimeter, namely, inaccuracy of the results beyond the forty-fifth degree, is not applicable to the hand campimeter, as it is designed for examination of the central field up to the forty-fifth degree. It practically includes the entire color field.

A specially devised chart is used to record the results of the examination. The chart is an exact reduction of the board, and has the advantage of being free from unnecessary lines which only tend to obscure the field when recorded.

Special mention should be made of the advantages of an examination at so close a range as six and a half inches. The line of separation between blind and seeing parts of the retina is more sharply and more accurately made than at the greater distance suggested in the Bjerrum method and its modifications. In a study of scotomatous areas this fact is well established—colors have a more definite value. Furthermore, qualitative color changes are recognized and indistinct scotomatous areas are mapped out when the ordinary campimeter and arc perimeter fail to reveal them. The instrument rests firmly against the face, and the distance of six and a half inches is uniformly maintained, just as in an examination on an arc perimeter.

It is not intended to replace the arc perimeter or campi-

meter of usual size. It is, however, especially designed to study the central field up to forty-five degrees, and as it includes practically the entire color field of a normal individual, the instrument may be used in a large number of pathologic cases heretofore studied on the large campimeter or arc perimeter.

The advantages claimed for the hand campimeter are:

First, the great advantage of any tangent perimeter over an arc perimeter, namely, flexibility.

Second, accuracy in the studying of the central field (a) for color field defects, (b) for scotomata, (c) for changes in the normal blind spot.

Third, accuracy of the patient in determining shades of difference in color values at the close range of one-sixth of a meter, when contrasted with studies made at a greater distance.

Fourth, lightness and portability of the instrument, admitting of a field study with the best possible daylight.

Fifth, inexpensiveness of the instrument. The excessive price of the ordinary instrument is a great barrier to its more general use. The hand campimeter can be obtained at a moderate cost.

An Improved Hatpin for Measuring the Visual Field. As E. Maddox[9] points out, a white-headed hatpin makes an excellent test object, but as used at present, the movement of the hand which holds it is also visible and may defeat anything like a quantitative test. The little cylinder of wood, cork or rubber tube about half an inch long and of the thickness of a lead pencil, held between

Fig. 1. White hatpin of unit diameter with cylindrical grip.

the finger and thumb enables the hand to be kept perfectly stationary and yet allows the head of the pin to make considerable excursions with an almost insensible movement of the thumb and forefinger.

(9) Ophthal. Rec., June, 1915.

A Simple Plastoscope. The well-known method employed by artists of looking at plane pictures with one eye through the hand closed like a tube has three advantages, *viz.:* greater brightness, greater distinctness and plastic appearance. The two first advantages can be easily explained by the exclusion of lateral and cross lights. O. Zoth[1] explains the plastic effects by the exclusion of the surroundings of the picture, which furnish effectual elements for rendering the planeness of the picture more striking. If they are eliminated the motives in the picture for a conception of the represented third dimension are fully and without disturbance called into action and produce a surprising plastic effect. On this principle the writer constructed his plastoscope, which consists of a tube 8 cm. long, blackened inside, with an eye piece shaped for application to the orbital margin.

The Mydriatic Action of Dextrohyoscyamine. The interesting account given by R. J. Terry and M. Wiener[2] of the ocular action of this drug is here given almost in full. During the winter of 1911-1912, they discovered a property of dextrohyoscyamine which hitherto had not been described. Dropped into the conjunctival sac, it dilates the pupil to the maximum, having little or no effect on the accommodation.

Cushny had previously reported the results of his experiments on animals, both by local application and by hypodermic injection; principally the latter. Naturally the effect on accommodation could not very well be studied on the lower animals. In his work on pharmacology, published in 1910, he states that atropine has been shown to be a mixture of equal parts of natural, or laevohyoscyamine, and that of its dextrorotary isomer, which differs from the ordinary or laevohyoscyamine, in the way it rotates polarized light. Dextrohyoscyamine does not exist free in Nature, and possesses only a feeble action on the nerve terminations, while it stimulates the spinal end of the frog more than either atropine or hyoscyamine. The peripheral action of atropine is thus due to its containing hyoscyamine; and as a grain of atropine contains only one-half a grain of hyoscyamine,

(1) Zeitsch. f. Sinnesphys., 45, p. 85.
(2) Ann. of Ophthal., July, 1915.

the former exercises only half the effect of a grain of hyoscyamine. On the other hand, the half grain of dextrorotary hyoscyamine in a grain of atropine is almost inert on the nerve terminations, but exercises the same effect on the central nervous system as its laevorotary complement. Atropine thus acts on the central nervous system in mammals in the same strength as hyoscyamine, but only half as strongly in the periphery.

The experiments of the writers were chiefly concerned with the local application of dextrohyoscyamine in man. They found that a 0.5 per cent. solution of dextrohyoscyamine instilled in the human eye caused a dilatation of the pupil to a width of from 5.5 millimeters to 8 millimeters in about forty minutes, lasting on an average twelve hours, before returning to the original size; also that the accommodation was disturbed very slightly in most cases, and in some cases not at all.

They found, after a short while, that the accommodation was affected for a much longer period and to a much greater extent in some individuals than others, and that this was due to the solution not being perfectly fresh, the dextrohyoscyamine rapidly changing to the laevorotary form when in solution, and affecting the accommodation like atropine. They corrected this by keeping a one-fourth grain of dextrohyoscyamine powder in a one dram bottle, and filling the bottle with water just at the time of using.

Later the firm of Burroughs, Wellcome & Co. put it up in tabloid form ready to introduce in the conjunctival sac. This form is stable and effective. One objection to it is that it causes a sensation of rather severe burning for about a minute after being introduced in the conjunctival sac, which is not the case when the solution is used.

The writers have seen no detrimental effects on the eye from its use on a series of several thousand patients. It has been used as a daily routine for the past three years for dilating the pupil for examination of the fundus, and for making the shadow test in refraction, and has proved satisfactory.

Its advantage over euphthalmine is that it dilates much more quickly and more effectively. Its only disadvan-

tage is its unstable quality in solution and, in the form of the tabloid, a temporary uncomfortable burning sensation.

Self-illuminated Berger Loupe. A useful modification of this device has been invented by E. A. Shumway.[3] It consists in the attachment to its side of a brass clip to hold the small flashlight, which has the appearance and size of a stylographic pen. The light has a small, one-cell battery, which illuminates a tungsten filament lamp, and has a permanent turn-on arrangement. It can be purchased at any of the electrical supply houses, or instrument shops. (Plate Ib.)

The light rays from the lamp are projected toward the focal point of the Berger loupe, and give sufficient light to illuminate satisfactorily the eye under examination. It has been of especial value, however, in the removal of foreign bodies from the cornea, and in pulling out delicate misplaced cilia from the eyelids, as it gives an independent source of illumination, and leaves both hands free for manipulation of the eyespud, and for holding the patient's eyelids. It has also the advantage of being independent of wires to batteries or rheostats, and can be readily removed from the loupe when illumination is not required.

The Zeiss loupe has also a lamp to illuminate the eye, but the instrument is much more expensive, the lamp requires a separate battery or rheostat, and moreover, the focus is rather short—1¼ inches—while the Berger loupe focuses at about 2 inches, giving more space in which to move the spud, or other instrument.

Other arrangements have been employed to illuminate the eye in removing foreign bodies, but they are not sufficient, when the operator requires binocular magnifying power to assist his near sight. Self-illuminated spuds, Shumway thinks, are unsatisfactory as the illumination is not constant, but varies with the distance of the spud from the eye. Moreover, it is very difficult to get patients to hold their eyes still, as they seem to fear a shock of some sort, when the light from such an instrument, connected by wires to a battery or rheostat, approaches the eye.

(3) Trans. Amer. Ophthal. Soc., 1915; Jour. Amer. Med. Ass'n., Oct. 16, 1915.

The ordinary tungsten lamp furnished by the Ever Ready Company has a plain glass top. For more powerful illumination Shumway has replaced it by an imported lamp, which has a small magnifying lens fused on the top, by means of which the light rays are better concentrated. This makes the apparatus more useful in dispensary work, especially in the examination of inflammatory conditions of the anterior portion of the eyeball or its adnexa, making it usually unnecessary to take patients to a dark room. The loupe has been cut out on each side to remove the obstruction to lateral vision, of which complaint is occasionally made, but this is not a new feature.

The modified apparatus can be obtained from Wall & Ochs, Philadelphia, who will attach the clip and lamp, or furnish the entire outfit.

REFRACTION AND ACCOMMODATION.

Some Historical Data Concerning Glasses. In a very instructive article on this subject Emory Hill[3] claims that the inventor of glasses is unknown; the nations of antiquity probably knew nothing of these instruments; the ancient classics are devoid of mention of glasses. Alhazen seems to have made no practical use of his knowledge of optics. Near the end of the thirteenth century convex spherical lenses came into use in China and in Europe. It is probable that neither obtained their knowledge from the other. European evidence favors the view that Roger Bacon made glasses independently of Chinese influence or re-discovered the invention of some learned predecessor.

The Condition of the Eyes of Monkeys Made Artificially Myopic. G. Levinsohn[4] gradually produced high myopia with not intense, but characteristic, myopic changes in the eyes of monkeys, which were forcibly "restrained" for several hours of the day in a horizontal position, so that the sagittal axes of the eyes had a vertical direction. The first monkey had, after six months of this treatment, an increase of refraction to 11 and 12

(3) Ophthal. Rec., October, 1915.
(4) Arch. f. Ophthal., 88, p. 452.

D., the second to 7 and 9 D. The ophthalmoscope showed a temporal conus and a nasal supertraction crescent. The anatomic changes were produced by obliquity of the entrance of the optic nerve, enlargement of the anterior entrance of the scleral canal, very intense supertraction of the elastic lamina plus pigment epithelium at the nasal side, under attenuation of the nasal scleral wall and its blending with the dura of the optic nerve, considerable reduction of the temporal edges of the sclera, retraction and detachment of the elastic lamina plus pigment epithelium, tortuosity of the optic fibers at their transit through the sclera, so that the fibers formed a very acute angle at the nasal side and several very marked convolutions at the temporal side; then retraction and atrophy of the choroid at the temporal margin of the disc, obliquity of the retinal layers, crowding of the central vessels to the nasal wall of the scleral canal, thickening of the superposed bordering tissue at the temporal margin of the optic nerve, incipient rarefaction of the pigment epithelium at the temporal side. These changes corresponded to the ophthalmoscopic temporal conus and nasal supertraction crescent.

Levinsohn explains the pathogenesis of these anatomic changes by his theory of myopia. The force involved in the stooping position of the trunk and head, and the traction of the eye at the entrance of the optic nerve in sagittal and nasal directions must produce changes, characteristic of myopia. The agencies flatten the edge of the temporal margin, produce a retraction of the elastic lamina and pigment epithelium, and cause supertraction at the nasal border.

[In reading a description of these "experiments" one hardly knows which to admire the more—the ingenious brutality of the methods employed or the calmness with which the investigator discusses them. One is tempted to wonder what would have happened had the poor simians been suspended six hours a day by the tails, or by one leg!—Ed.]

Vertex-Refraction. From a strictly practical point of view C. F. Prentice[5] believes that the vertex-system is a reliable monitor to insure the righteous performance

(5) Ophthal. Rec., June, 1915.

of convex lenses, especially those which are stronger than 7 diopters, and a subtle guide to the correct substitution of a deeply curved lens, either spheric or toric, for any lens or combination of lenses that may be mounted in the trial frame at a definite distance from the eye. More can not be consistently claimed for it. While it is true that the vertex-system of measurement and the method of neutralization are equally inefficient with respect to disclosing the true refracting power of a strong convex lens, yet the present practice of neutralization should be perpetuated as an eminently convenient means of verifying the fact that: When two contra-generic lenses, of any power and of minimum thickness, effectually neutralize each other, they are of the same vertex-refraction.

Accommodation Spectacles. In a recent communication Hans Lauber[6] describes these glasses, which resemble in shape telescopic spectacles. Each eye of the spectacles consists of 2 lenses, mounted at a small distance from each other in such fashion that the anterior lens can be removed from the posterior lens, whereby the refraction of the whole optical system is increased. The refraction can be varied four diopters, which suffices for the practical use of a person deprived of accommodation. He thus can accommodate for any distance from infinity to 25 cm. The field of fixation is limited to 24°. The spectacles weigh 43 grams. They are adjusted by one screw, and the mechanism assures simultaneous correct convergence, imitating the normal process.

Shooting Glasses. This subject in both its civilian and military aspects is discussed by E. Krückmann and Kern.[7] Shooting glasses for emmetropes are intended for diminishing or removing a disturbing glare for the better discernment of distant small objects. In many cases it can not be decided whether the injurious effect on the eye is due to excessive intensity or to the wave length of the rays. To this uncertainty corresponds the variety of protective means. Hunters found empirically that yellow glasses have a certain advantage against

(6) Arch. f. Ophthal., 89, p. 401.
(7) Publications on Military Hyg., Med. Dept., Royal Prussian War Office, Part 58, Berlin.

glaring, and increase the contrast action of colors. For this no satisfactory physical and physiologic explanation can be given, as exact quantitative measurements of contrast in different intensities of illumination and adaptation of the eye are lacking. Haitz explains the favorable effect of yellow glasses by the darker appearance of the blue shadows, which in nature are frequent in bright weather. Perhaps yellow glass may have advantages, still unknown, against an enemy dressed in khaki. Yellow glass transmits yellow rays unchanged but the short-waved (especially blue) rays are diminished.

The advantage of yellow glasses at dusk has been explained as follows: In subdued illumination and corresponding dark adaptation of the eye yellow and red hues appear darker; green and blue hues seem lighter. If through the yellow glass blue and green are physically diminished, the yellow colors become relatively lighter, and objects, *e. g.*, yellow animals, more distinct. As these questions can not be decided theoretically, Krückmann recommends shooting glasses of euphos, or of Hallauer yellowish-green, and, in intense illumination, the old approved grey glasses.

Kern reports on the shooting results with different kinds of lenses, which demonstrate that the Punktal glasses are far superior to all hitherto worn. He considers, however, ordinary periscopic lenses to be amply sufficient for the army, provided they have higher degrees of crescentic curvature. The lenses must be large, round and a diameter of 4 cm., the distance from the cornea 12 to 13 cm., mounted in riding bows of hard nickel, and they should be worn constantly. Euphos and Hallauer glasses prevent glaring, but Krückmann considers this advantage not great enough for recommending their introduction into the army.

Wide-Aperture Lenses. Punktal and Katral Lenses. C. F. Prentice[8] describes the Punktal lens, which is numbered in vertex-refraction and designed to eliminate the astigmatism due to oblique light-incidence and to render available a field of view of about 60°, in order that objects viewed through the extreme marginal zone of the lens may be seen as distinctly as through its center.

(8) Ophthal. Rec., July, 1915.

When the power of the convex Punktal exceeds 7 D it is called a Katral lens, in which the base curve is made aspheric, in order to correct the aberration for the full aperture of a meniscus of high power.

Prentice is of the opinion that the Punktal lens is the most scientifically devised ophthalmic lens yet produced, even though in some powers it may be objectionably thick. The cost of a pair of Katrals is said to be about $75.00.

The same subject is also discussed by F. Schanz.[9] He draws attention, first of all, to the fact that under a bright sky shooting results are inferior to those in cloudy weather. The bright light of the sky tires the eye. This is due to the short waved rays, not directly visible to the eye. They are partly absorbed by the crystalline lens, partly converted into rays of greater wave length and cause the fluorescence of the lens. The glaring at sea, on high mountains, of aeronauts, and snow blindness are also produced by these rays. The euphos glass of Schanz absorbs these rays and protects the eye from their injurious influence. Flemming experienced this relief in a balloon flight over 8,000 m. and R. Amundsen in his expedition to the South Pole.

The short-waved, invisible rays also diminish the perceptive faculty of the retina at dusk, which can be prevented by euphos glass. In addition, its yellowish green color increases the contrasts in nature. Bluish tints appear through it black, so that the parts illuminated by reddish and yellowish light are better displayed, and targets can be recognized, which the naked eye can not distinguish. Schanz recommends for the navy euphos gray glasses against glaring by searchlights, etc.

HYGIENE AND ECONOMICS OF THE EYE.

An Exact Definition of Blindness. The importance of defining, if possible, the condition of blindness, has for a long time exercised the minds of those concerned in the teaching and maintenance of the blind. As H. B. Grimsdale[10] points out, it is common to define the status of a blind child as one who is unable to read the ordinary

(9) Münch. med. Wochenschr., 61, p. 2191.
(10) Brit. Med. Jour., Dec. 12, 1914.

school books. Yet all children who do not come into this definition are not fit for the ordinary school—for instance, subjects of high myopia. It is desirable to have some rule for evaluation as a guide in each case. For certain employments a greater acuity is needed than for others. Those having no perception of light are but a small proportion of those ranked among the blind, while among children the proportion is still smaller. The blind persons in the United Kingdom number about 27,000, according to the census, but these figures can not be accurate. The ratio of the totally blind to the economically blind is about 1 to 9. The causes of economic blindness in children differ considerably from those in the adult. In the former, the chief trouble is loss of central acuity from corneal conditions; while in adults disease of the optic nerve, with contraction of the visual field, operate chiefly. There is a tendency to make the standard of vision too high, and thus throw a large number of children into the "blind" class. Once labelled "blind" a child is liable to be drafted into a blind workshop. The co-education of the blind and the seeing is one of the most interesting experiments which have been conducted; the blind child is first started in a special school until he has mastered the elements of Braille writing and reading; then he takes his place among sighted children in the universal school, and often competes successfully with normal children. Between the "blind" school and the normal school there should be a third school for children who have such visual defect that they can not be taught by the aid of the blackboard. His suggestion is that a distant acuity of 6/60 should be taken as the highest limit of vision for a blind school child. Those whose vision is better than 6/24, unless otherwise recommended by a medical man, he would send to an ordinary school. All special schools should be inspected at least once a year, and the vision of each child tested and recorded.

Conservation of Vision. Conservation of vision, says E. W. E. Everard,[1] considers total or partial impairment due to infections, constitutional diseases, injuries, occupational diseases or hazards, furnishing of glasses by the incompetent, workshops, offices, stores, etc., prophylactic

(1) Jour. Mich. State Med. Soc., January, 1915.

measures at birth and improper knowledge concerning the care of the eyes. He questions the advisability of giving the midwife a legal status which would not later perhaps be altered. He calls attention to the three channels through which conserving the sight problem may be solved, education, legislation and publicity. He believes it would be a great advancement if by law it could be made a misdemeanor for any but physicians to fit glasses for near-sightedness and for patients whose glasses fail to produce normal vision. He quotes the law passed by the Michigan legislature in 1913, relating to ophthalmia neonatorum in which the State Board of Health names and approves as a prophylactic 2 per cent. silver nitrate solution in the eyes of new-born infants.

The work of that most useful organization, *The Committee on Conservation of Vision of the Council on Health and Public Instruction, American Medical Association*,[2] is set forth in a recent report by its chairman, Frank Allport. Lectures have been given during 1915 in thirty-eight states; 490 lectures having been delivered to audiences aggregating 113,898 people.

This is a distinct gain on the work accomplished last year, when 339 lectures were delivered in thirty states to audiences aggregating 69,425 people. It will thus be seen that in the last two years this committee has been able to report 829 lectures delivered to audiences aggregating 183,323 people.

As one of many instances of actual results from the Committee's work, in Butte, Mont., the following diseases were noticed in school-children, whose eyes, ears, etc., had been tested: 42 tonsils and adenoids; 20 refraction; 3 conjunctivitis; 1 discharging ear; 1 catarrhal deafness. In Seattle, Wash., a nearly perfect system of medical school inspection has been placed in operation. In nine months, 3,886 cases have been treated among the children, and 243 operations have been performed; 42,000 school-children have been examined, 1,600 homes have been visited and school nurses have been inaugurated. In South Dakota, a Society of School Hygiene has been formed in Deadwood, and several cities have adopted medical school inspection. Operations have been per-

(2) Jour. Amer. Med. Ass'n., July 3, 1915, p. 103.

formed in many cases of tonsils and adenoids, and many pairs of glasses have been fitted in the various towns and cities. In Pennsylvania, 400,000 school-children were examined last year. In Philadelphia, there are three school clinics for eyes—one where services and glasses are given free. The attending eye surgeons are paid by the city. Two hundred thousand slips have been pasted in school-books, giving advice as to the care of the eyes. In Portland and La Grande, Ore., the eyes, ears, noses and throats of the school-children are annually and systematically examined by school-teachers. In Alabama, Walker County has a full-time health officer; Tuscaloosa and New Decatur have regular medical school inspectors. In Utah, each school-room in Salt Lake City is supplied with charts for testing eyes, ears, etc., and there are seven school nurses in that city. In New Hampshire, twenty-nine towns and cities have medical school inspection. In Ohio, Germantown has just adopted medical school inspection. One lecture was the means of establishing another field worker. Many cases of tonsils, adenoids, cataracts, strabismus, etc., have been operated on, and many glasses have been fitted. Many small pamphlets and leaflets have been issued and much newspaper publicity has been obtained. Several epidemics of trachoma have been discovered and stopped. In Iowa, systematic and annual eye, ear, nose and throat tests are made, and school nurses are in attendance in Marshalltown, Fort Madison, etc. In North Dakota, annual and systematic eye, ear, nose and throat tests are made in LaMoure, Grand Forks, Fargo, etc., and in Wells, McHenry and Ransom counties; in these places there are also school nurses. In Wyoming, Cheyenne enjoys medical school inspection. In Kentucky, a strong effort is being made to pass a law for the annual and systematic examination of school-children's eyes, ears, noses and throats by school-teachers. The Committee is materially helping the movement to stamp out trachoma. A recently enacted law in Kentucky compels the State Board of Health to conduct schools in each county, on which attendance is made compulsory, for the instruction of physicians and midwives concerning the prevention of blindness, with particular reference to trachoma and ophthalmia neonato-

rum. In Maryland, Miss M. V. Kelly, a field agent, visited the schools and hospitals in Salisbury, Euston and Cambridge and interviewed the physicians and found many cases of bad eyes, and saw that many children were relieved.

It is interesting to relate that one optician alone in Chicago sold about 5,000 vision charts for schools, with teachers' instructions attached, during the past year. This will be something of an indication as to the interest awakened in this matter.

"These few state reports refer to fragmentary work performed quite recently, and do not at all indicate the total amount of state work accomplished. The chairman merely wishes to convey by these scattering and fragmentary items the impression that our work is creating interest all over the United States. Our lecturers have not confined themselves to lectures purely devoted to the eyes, but have included ears, noses and throats in their talks, and have dwelt a great deal on the general subject of medical school inspection, and their labors have borne fruit all along these lines. The chairman does not wish to convey the idea that all eye work in the several states has been the result of the work of this committee; this would not be true, especially in such states as Ohio, New York, Pennsylvania, etc., where they have most efficient state organizations. The chairman merely wishes to declare that this committee is one of the factors working for good in the United States, and that its work is surely helping along the movement for visual conservation, and that many of the good results can be directly traced to the influence of this committee. A work which, for instance (in most instances), can be fairly attributed to the influence of this committee and usually to its *direct* personal influence, is the passage of laws in some states for the annual and systematic examination of school-children's eyes, ears, noses and throats. Eighteen states have laws of this character. The names of these states is here given with the dates of the enactment: (1) Connecticut, 1899; (2) Massachusetts, 1906; (3) Colorado, 1909; (4) Maine, 1909; (5) Pennsylvania, 1911; (6) Indiana, 1911; (7) Utah, 1911; (8) Vermont, 1912; (9) North Dakota, 1913; (10) West Virginia, 1913;

(11) New Hampshire, 1913; (12) New Jersey, 1913; (13) New York, 1913; (14) Maryland, 1914; (15) Wyoming, 1915; (16) South Carolina, 1915; (17) Oklahoma, 1915; (18) Delaware, 1915. It would be desirable to give these various laws in detail, but space forbids; suffice it to say that they vary considerably in their language and requirements—some merely advise that this work be done, that the state endorses it and will pay the expenses of furnishing printed material for the tests up to a certain limit. Others make the procedure obligatory, while one state (Delaware) has no state law, but the tests are ordered by the Board of Education.

"While a publication, at this time, of all these laws is impracticable, it has been deemed advisable to publish one of the best laws, to guide those interested in the passage of such laws in other states, concerning a reasonably good law to present to the legislatures. A copy of the Wyoming law is here given. It is particularly praiseworthy on account of its brevity, plainness and unambiguous language."

Section 1. It shall be the duty of every teacher engaged in teaching in the public schools of incorporated cities and towns of the state separately and carefully to test and examine every child under his jurisdiction to ascertain if such child is suffering from defective sight or hearing or disease of nose and throat.

Section 2. In making the tests required by Section 1 of this act the teacher shall employ eye testing charts of a standard character approved and supplied by the State Superintendent of Public Instruction and shall conform to the rules of the State Superintendent in methods of applying such tests, especial attention being given to defects that may be disclosed by the following questions:

1. Does the pupil habitually suffer from inflamed lids or eyes?
2. Does the pupil fail to read a majority of the letters in the number twenty line of the standard vision chart with either eye?
3. Do the eyes and head habitually grow weary and painful after study?
4. Does the pupil appear to be "cross-eyed"?
5. Does the pupil complain of earache in either ear?
6. Does matter (pus) or a foul odor proceed from either ear?
7. Does the pupil fail to hear an ordinary voice at twenty feet in a quiet room?
8. Is the pupil frequently subject to "colds in the head" and discharges from the nose and throat?
9. Is the pupil an habitual "mouth breather"?

If an affirmative answer is found to any of these questions

the teacher shall give such pupil a report to his parent or guardian made on a report blank prepared and furnished by the State Superintendent of Public Instruction, such report to be made in form prescribed by the State Superintendent.

It shall be the further duty of the teacher to record the results of the examinations required by Section 1 of this Act in such a manner as may be described by the State Superintendent of Public Instruction.

Section 3. It shall be the duty of the State Superintendent of Public Instruction to prescribe rules for making such tests as are required by this Act and to prepare copies thereof, together with all blanks, charts and printed forms deemed necessary by the State Superintendent for carrying into effect the provisions of this Act, and to distribute them to all the public school teachers in incorporated cities and towns of the state, such distribution to be made through the district boards or, if there be such, through the executive officers thereof, the expenses of such printing and distribution to be borne out of the State Superintendent's contingent: provided that, the annual expense for such purpose shall not exceed one hundred and fifty dollars.

Section 4. During the first month of each school year, after the opening of school, teachers must make the tests required of this act upon the children then in attendance at school: and thereafter, as children enter school during the year, such tests must be made immediately upon their entrance.

Section 5. It shall be the duty of the Boards of Trustees of the several school districts of the State to enforce the provisions of this Act.

Section 6. This Act shall take effect and be in force from and after July 1, 1915.

"It will be observed that the last ten states to pass eye and ear laws date the laws from 1913. It was in 1913 that this committee began its work, and it is only fair to presume that the passage of those laws in 1913, 1914 and 1915 was more or less inspired by the existence of this committee. Indeed, in some of the states like Wyoming, South Carolina, Oklahoma and Delaware it can be safely said that the laws were passed through the direct influence of our managers and lecturers in those states. The Wyoming law owes its existence, for instance, to Dr. George L. Strader, our state lecture bureau manager, who is also a member of the state legislature; and the Delaware law would never have been passed had it not been for the work of the state manager, Dr. J. A. Ellegood.

"Many of our state organizations are helping greatly

in the passage of laws concerning ophthalmia neonatorum, trachoma and in fighting optometry laws; and it can be truthfully said that the influence of this committee can hardly be overestimated in promulgating the doctrine of good eyes, along all of its channels.

"To recapitulate what this committee has accomplished during the last two years:

"1. It has provided 829 lectures to audiences aggregating 183,223 people.

"2. It has caused to be written twenty pamphlets on eye subjects, with a distribution of 34,000.

"3. It has supplied the *Press Bulletin* of the American Medical Association with short, practical articles on eye subjects that have reached hundreds of thousands of people.

"4. It has distinctly aided in producing a sentiment over this entire country on the subject of visual conservation.

"5. It has been the means of greatly assisting in the enactment of laws, concerning the examination of school-children's eyes, ears, noses and throats, and laws concerning trachoma and ophthalmia neonatorum. It has also greatly assisted in defeating laws concerning the practice of optometry.

"6. It has had much to do with regard to stimulating interest in general medical school inspection, school nurses, etc., and in the establishment of these much needed conditions in many cities.

"7. It has been the means of relieving thousands of school-children of adenoids, enlarged tonsils, discharging ears, deafness, inflamed eyes, crossed eyes, headaches, near-sightedness, etc., and thus has not only improved their educational possibilities and general physical and sociologic conditions, but also at the same time has greatly benefited the physical, mental and nervous condition of their teachers.

"8. It has signally aided the campaign against 'shop accidents' by its pamphlets, lectures, etc., warning the public against such accidents, and telling how they can best be prevented."

The Physician Versus the Midwife in the Matter of Ophthalmia Neonatorum. Statistics furnished by E. M.

Alger[3] show that many more cases of ophthalmia neonatorum appear in patients who are attended by physicians than in those attended by midwives. One reason may be that the midwife is more likely to employ prophylaxis as a part of the routine, while the physician who has been permitted to use his own intelligence and who believes ophthalmia neonatorum is only of gonorrheal origin does not use a prophylactic where he feels certain no such infection existed. The writer gives statistics, some placing the gonococcus as present in 64 per cent. of cases of ophthalmia neonatorum, others as low as 20 per cent. or 30 per cent. The writer calls attention to the fact that ophthalmia neonatorum is ordinarily a comparatively mild affection, the mother having acquired a systemic immunity to the gonococcus or other pyogenic organism which she has harbored and which the child during its intra-uterine life has acquired. The author warns against too severe measures being used in treatment, believing that more eyes are lost through the violence of the treatment than through the violence of the disease itself, since the great danger is ulceration of the cornea from traumatism. He believes the watchwords should be cleanliness, drainage and gentleness, and he believes that many cases can be treated as well at home as in the hospital, and that since the nutrition of the child is all important, it should not be separated from its mother.

Does the Complete Loss of an Eyeball Entitle to a Higher Indemnity Than Mere Blindness? The case of a man who was examined twelve years ago, on account of pain and lachrymation of the right eye in which he lost the sight by an accident in 1890, is discussed by A. Perlmann.[4] Eight years later the blind eye was again injured, and enucleated. The writer had to answer the question, whether the loss of a blind eye causes a permanent decrease of earning capacity. After discussing it in detail he reached the following conclusions:

In almost all cases of unilateral blindness from trauma the injured person has by the enucleation of the eyeball

(3) Med. Times, November, 1914.
(4) Zeitschr., f. Augenheilk., 32, p. 431.

and insertion of a well-fitting prothesis been protected from annoyance, disfiguration and further physical damage. With a good artificial eye he is at least not worse off than with a blind natural eye. Hence the removal of a blind eye has not further decreased the earning power, and a claim for higher allowance can not be upheld.

Training for Blind Soldiers. The following is a verbatim account of this subject by J. H. Hare, photographer for *Leslie's Illustrated Weekly*:[5]

"One of the beautiful West End, London, villas, with its magnificent park of 403 acres has been turned into a training school for soldiers and sailors blinded in the war. It is St. Dunstan's Villa, now leased by Otto Kahn, of New York, and through his generosity placed at the disposal of the Blinded Soldiers and Sailors' Care Committee, of which C. Arthur Pearson, president of the National Institution for the Blind, is chairman. I had a hazy notion that Mr. Pearson was blind, but changed it when he rose from his seat to greet me and, looking me straight in the face, glowed with enthusiasm over the work they were accomplishing in training these sightless men. Whilst we were talking one of his secretaries approached from the other end of the room and stood hesitatingly with a telegram in her hand. She had made not the slightest sound, but he instantly excused himself for a moment and inquired what she wanted. Then I was sure he was not blind, but only to be undeceived later.

"It was astounding to see with what confidence the men who had been there some time moved around owing to a little device. There was a strip of matting on the floor which denoted a free passage. No obstruction was allowed to be placed upon it so they could walk upon that with confidence. When their feet touched a raised mat they knew they were near a door; outside the building a strip of lead a couple of feet in width took the place of the matting and boards placed across the passageway denoted the need of caution—either there were steps near or some other obstruction that called for care in moving around. It was really a danger signal.

(5) Sept. 23, 1915.

"There were over 70 inmates, including three or four Canadians. Most of them had received their injuries in the trenches, some by bobbing their heads up to see what was going on, others hit by shrapnel. Gas did not seem to be responsible for any of the injuries. Everybody about the place endeavored to instil confidence in the men. There was no attempt to coddle. Instead of wasting time sympathizing, which only made them feel their affliction worse, they were told how fortunate they were to be alive or not to have lost limbs as some had. The management knew that if these men returned to their homes they would be acclaimed heroes, as they undoubtedly are, and a good deal of enthusiasm would be expended upon them in giving them as good a time as possible, but after a time this would begin to pall and they would become a burden to the community, so it was essential for the future of the men themselves as well as their friends that they become self-supporting if possible.

"It was astonishing to see with what enthusiasm they entered into the different professions, which included massage, boot-repairing, mat making, market gardening, poultry raising, typewriting, even carpentry. It was a revelation to see the skill already acquired by the blind—many teachers from blind schools have given their services to help the staff that was recruited from the Voluntary Aid Detachment, and some of these teachers, blind themselves, have demonstrated their efficiency by becoming experts in various professions.

"The Braille system of reading, writing and typewriting is taught. One of the teachers, a Miss Wood, I was told could take dictation at the rate of 120 words a minute. Instead of the stenographer's note book a small machine has been invented to make dots.

"Then there were men learning poultry breeding, attending to the incubators, cleaning out the houses, etc., some even making their own brooding houses, and foster mother contrivances. Owing to an ingenious use of small pieces of glass used as a jingle, it was an easy matter to open and shut gates leading from the various fowl runs. When the men are qualified it is intended to set them up

in business in a small way, probably in their native towns, and to get the public to help them to help themselves."

The Protection of the Normal Crystalline Lens Against the Harmful Effect of Ultra-Violet Light. W. E. Burge and A. J. Neil[6] describe a series of experiments carried out to determine whether opacity of the lens or cataract could be produced in excised pig and ox lenses by radiant energy. The authors' method of conducting the experiments and their conclusions are:

1. Cataract or opacity of excised pig and ox lenses can not be produced by means of radiant energy from the infra-red, the visible, or the ultra-violet regions of the spectrum, under conditions much more extreme than any to which the human eye is ever subjected, provided the heat effect be excluded.

2. The lens protein can be so modified by weak solutions of the salts that are found in cataractous lenses and by dextrose that ultra-violet radiation can produce coagulation and hence opacity of the lens or cataract.

3. The same substances which modify the lens protein so that ultra-violet radiation can produce opacity also decrease the fluorescence of the lens.

4. Fluorescence bacteria are more resistant to the action of ultra-violet radiation than non-fluorescing.

5. A provisional hypothesis is advanced that the great resistance exhibited by the lens and by fluorescing bacteria to the action of ultra-violet may be due to this power of fluorescing. The assumption is that the lens and fluorescing bacteria by converting the absorbed short waves into longer waves get rid of more or less of the energy which otherwise would have been spent in coagulating their protein.

[It is a serious question whether the foregoing series of experiments, as well as the vast majority of others conducted by means of such *animal* eyes as those of the pig, ox, rabbit, guinea-pig, etc., are of much or any value so far as deductions therefrom are drawn as to human eyes. Not only are the ocular tissues of the lower animals so different from those of man but the visual mechanism is entirely unlike the human ocular appa-

(6) Archive Ophthal., September, 1915.

ratus. If they are to have any real value comparisons should always be made with eyes of the higher monkeys. —Ed.]

Color Vision.

In J. H. Parsons' "Introduction to the Study of Color Vision" (1915), the author has endeavored to separate the best established *facts* of color vision from the *theories*.

The color vision of primitive races is defective while civilization seems to have developed the perception of colored tints. This is shown in children, for they do not distinguish color tints at an early age, some of them even up to the end of the second year, although there is good evidence that at the age of three months, an infant may experience the sensations of red, yellow, brown, green and blue; yellow and red being distinctly preferred. However, infants are susceptible to relatively small differences of brightness. The outstanding characteristics of all abnormalities of color sensations is that abnormal people see fewer hues than the normal. The great difficulty in arriving at a true conception of the relationship of any abnormal color system to the normal is psychologic. No individual can judge with certainty the sensations of any other individual; therefore, it should be clearly understood that the name of the color when used for various color sensation must not be relied upon as accurate criteria of their sensations as compared with the normal.

The author accepts the descriptive terms protanope for red, deuteranope for green and tritanope blue blindness, but there are other forms of color blindness, reaching even to totality or monochromats.

Red-Green Blindness After Glaring by Snow. Additional cases of red-green blindness after glaring by snow are reported by W. Lohmann.[7] In the first case the color disturbance was transient. In the second case a congenital alteration of the color sense showed a further transient deviation by the glaring through snow, which under constant observation decreased to a stationary condition, as it is found in congenital extreme green anomaly.

(7) Archiv. f. Augenheilk., 79, p. 35.

BACTERIOLOGY OF THE EYE.

Ocular Parasites.

The Diplobacillus Liquefaciens of Petit. The diplobacillus of Morax-Axenfeld in the nose has often been recorded, yet the presence of the closely allied organism, the diplobacillus of Petit, in the same situation has not hitherto been reported, nor, so far as F. E. Taylor[8] is aware, has either of these organisms been previously found in the throat. A case is reported by Taylor. The writer's reading of this case is that the pharyngitis was a staphylococcal infection, and that the diplobacilli were not the causal organisms, seeing that they persisted in the throat after the pharyngitis had cleared up. The diplobacilli were banished from the throat after a zinc sulphate gargle had been given, but persisted in the nose, probably owing to the difficulty encountered by the patient in himself performing the nasal irrigation.

With the absence of the diplobacilli from the conjunctival sac, their ready disappearance from the throat, and their persistence in the nasal cavities possessed of healthy mucous membranes, we may conclude that this patient is a chronic nasal carrier of the diplobacillus of Petit, and that the organisms obtained from the throat were derived from this source.

Acute Bacillus Tularense Conjunctivitis. An instance of this exceedingly rare disease, the first account of which was given last year by Vail in the *Ophthalmic Record* and noticed in this *Series,* is reported by Robert Sattler.[9]

A woman of 43 complained of a very irritable left eye. She was nervous, excitable, loquacious and mildly delirious. There was marked swelling in front of the left ear, edema of the upper lid, conjunctiva of the bulb slightly chemotic, that of the lid and fornix swollen and dusky in appearance and traversed by thin, translucent, corrugated, sausage-like tubes or lines. The cornea was clear. Irregularly scattered in the conjunctiva were small points of infiltration about the size of a split pea, resembling pustules which had ruptured and had been

(8) Ophthal. Rev., September, 1915.
(9) Archiv. of Ophthal., May, 1915.

converted into shallow ulcers. The discharge was watery and straw colored. Temperance was 104 F. Constitutional symptoms were very severe. There were glandular enlargement, excessive prostration, profuse chills and malaria, also excessive swelling in the neck.

There was slow recovery with disappearance of the ocular symptoms. On the ocular conjunctiva was a distinct caseated node in the course of a dilated lymph channel. Following its removal an immediate re-enactment of the same diseased process again took place within twelve hours. In two weeks it subsided.

In this case an animal inoculated with some of the material died in six days, and dissection showed lesions resembling those of the *Bacillus tularense*, and organisms resembling this bacillus were found.

Mycosis Fungoides. A case closely resembling *palpebral* blastomycetes is reported under this heading by C. M. Kleipool.[1] The patient, in June, 1913, showed an ulcer of the right inner ocular angle with firm border, which had progressed on the upper eyelid, and was pretty deep. After 20 *x*-radiations of one hour the discharge ceased, but much infiltration remained. In the beginning of 1914 much edematous swelling of the upper lid was present. Arsenic treatment had no success.

The patient stated that ten years ago he had itching spots on his knee, also above the right eye, on which scabs appeared and which secreted fluid. Spots later appeared on the back and legs. They went and came and differed in size. As a child he had what his mother called ringworm. His only complaint was itching.

The patient looked rather older than his age of 55. He had a fist-like tumor of the upper eyelid, 14 to 8 cm. large and about 2 cm. elevated above the surrounding. The tumor was in the skin and movable in its entirety; bluish-red, the surface moist through yellow, non-smelling discharge, soft, with pseudo-fluctuation. The borders of the tumor were sharply defined and firmer than the rest of the tumor. The eyelashes were gone. Vision was present on lifting of the lid. Patient had not much trouble; some itching, no pain; no swelling of the glands.

(1) Tyds. v. Geneesk., Jan. 9, 1915; abstracted in Ophthalmology.

At the left side of the forehead there was a large elevated patch, of lichen appearance, soft, sharp limited. A few of such spots were on other places of the body. Patient did not allow a histologic or blood examination. With Roentgen-ray treatment the tumor began to decrease. At the same time all the spots on the body began to heal; some disappeared altogether.

Ophthalmomyiasis. Five cases of the larvae of *Oestrus ovis* are reported by L. Beth[2] on the human conjunctiva. Human myiasis is very rare in Central and Southern Europe, but relatively frequent in Russia and very common in the tropics. Myiasis of the eye may destroy that organ, or it may only be a slight affection, according to the parts affected and the species of the larvae. Beth considers the presence of larvae of *Oestrus ovis* as a benign form, as in his cases the larvae had no tendency to penetrate the tissue and to produce permanent changes. While the most frequent cause of dermatomyiasis is sleeping in the open, benign ophthalmomyiasis, as in the writer's four cases, was due to the sudden flying of the insect against the open eye with such rapidity that a defensive movement was impossible. The immediate onset of ocular disturbances following the impact suggests that some species may at once deposit in the eye larvae already formed. Patients complain of itching, burning and lachrymation, and present the symptoms of acute conjunctivitis. The conjunctiva was red and swollen, and minute living organisms, very thin, white and elongated, were found that showed vermiform movements. After the instillation of cocaine the movements were retarded and the larvae became detached, so that they could be removed with forceps or by suction into a pipette. When the conjunctiva was irrigated with antiseptic solutions and yellow ointment applied the symptoms subsided immediately.

Chronic Sporotrichosis of the Eye. Another addition to the rather numerous examples of this infection is reported by A. J. Bedell.[3] It occurred in a man of 49 and had lasted two years. The skin of the right eyelids was congested, and there was an irregular conjunctival

(2) Klin. Monatsbl. f. Augenheilk., 54, p. 275.
(3) Ann. Ophthal., October, 1914.

mass 7x5x2 mm. to the nasal side of the upper right lid, extending 2 mm. beyond the ciliary margin. It looked like ordinary granulation tissue. The entire palpebral conjunctiva was congested, with many discrete follicles and numerous small ulcerating points which were shallow, yellowish gray areas. The inner half of the bulbar conjunctiva was also congested, with several enlarged follicles. The caruncular fold was three times its normal thickness. Both puncta were prominent and dilated, and the inner canthus flooded with yellow, somewhat tenacious mucopus. Pressure over the sac caused no regurgitation. The corneal epithelium was lost over an irregular (4 mm.) area on the nasal side. No fundus lesion. Vision 20/LXXX.

Treatment consisted in removal of the conjunctival granulations, opening ducts and sac and the removal of five firm, brown concretions therefrom, curettment of sac, painting entire conjunctival sac daily with tincture of iodine. Internally iodide of potassium in 2 grain doses was given three times daily.

Recovery was uneventful, the eye healing in 53 days. The sporotrichosis organism was composed of a branching space bearing mycelium which was septate and granular, together with fusiform bodies of uncertain origin. The spores were commonly isolated and attached to the mycelium by a short and thin sterigma. It was Gram-negative.

DISEASES OF THE EYELIDS.

Palpebral Syphilis. Within the past year or two a number of cases of chancre of the lids have been reported. Francis W. Alter[1] gives a recent account of a case and remarks that L. Duncan Bulkley states that 25 per cent. of all cases of lues are extragenital, and of this 4 per cent are on the eyelids. They were placed by him as ranking fifth in order of location for extragenital primary infection.

Alter quotes statistics from C. E. Finlay's "Double Chancre of the Eyelid."

(1) Ophthalmology, April, 1915.

According to Alter's investigations the primary lesion seldom develops on the outer skin but is almost invariably intermarginal or in the canthi or upon the conjunctiva tarsi. This is due to the fact that the cutis of the lid is not especially permeable, but the delicate textures of the canthi where the dermis changes to mucosa, and where the glands of the conjunctiva and the meibomian glands exude their contents, offer easy inoculation of the virus.

The pre-auricular and other glands are often so swollen that a diagnosis of mumps might be easily made.

The chancre develops as elsewhere and needs no special description other than to say that it takes on the same traditional characteristics as elsewhere, to-wit, ulceration, induration and adenopathy. Its principal means of differentiation from similar morbid conditions, such as vaccine pustule, lupus, tuberculosis, hordeolum chalazion, and gumma, is in the indolent nature and frequently marked swelling of the neighboring lymphatic glands.

In looking up the literature on the subject, the writer was impressed with the fact that the diagnosis of syphilitic chancre of the eyelids is not always simple.

He generalizes on the subject as follows:

1. Syphilis of the eyelids, although relatively a rare affection, occurs with sufficient frequency to justify our serious consideration.

2. From 3 to 5 per cent. of all extragenital primary affections are on the eyelids. The sources of infection are various, through kissing, removing foreign bodies with the tongue, etc. In this connection it has been well said that the sources of infection are as various as the possibilities for placing the spirochete in contact with the eye.

3. The clinical diagnosis is often perplexing. We must observe unrelentingly its differential aspect, holding well in mind that it simulates hordeolum, chalazion, tuberculosis, vaccine pustule, etc.

4. A chronic indolent lesion of the eyelid, with which is associated an enlargement of the pre-auricular and submaxillary gland, justifies a tentive diagnosis of specific involvement, and is an indication for a strict interpretation of any possible underlying specific disturbance. We should be remiss in our fullest duty in these cases if

we failed to employ such well-known laboratory methods which could have a clarifying effect on the situation.

5. The three essential laboratory aids in diagnosis, in order of value, are the Wassermann test, the search for the spirochete, and the luetin test.

6. Under the head of prognosis and treatment must be emphasized the fact that the intravenous injection of salvarsan, in these cases, stands in the first rank, supplemented by inunctions of mercurial ointment and, last but by no means least, potassium iodide in liberal doses.

7. It has been well said that when the cornea participates in the process the prognosis is much graver. By a timely recognition of the character of the disturbance much can be averted, and what is very important, we can spare ourselves the negative effect of an uncertain, wavering and mistaken diagnosis.

As regards this important matter of the diagnosis he lays particular stress on adenopathy as of prime importance in the diagnosis of palpebral lues. The presence of pre-auricular or submaxillary lymphatic involvement in the face of a chronic indolent process of the eyelids can, in the majority of cases, be definitely assumed to be due to lues.

Adenopathy is of such a constant character in this affection, acting very often as a diagnostic sheet anchor, that he enumerates as follows the ocular lesions in which we usually find pre-auricular or submaxillary participation:

1. Parinaud's conjunctivitis has as one of its classical symptoms, an enlargement, even to the extent of suppuration, of the pre-auricular gland. Its semi-translucent vegetations, superficial ulcers, etc., render a differential diagnosis of easy solution.

2. Lupus or tuberculosis of the lid, which is also associated with lymphatic involvement, can be distinguished by its superficial nature, and its tendency to heal in one area while spreading in another region. The enlarged glands, however, as a rule are painless, as in enlargement following lues.

3. In epithelioma we have an involvement of the lymphatic glands, and this enlargement is one of the distinguishing points between epithelioma and rodent ulcer

involving the lids. There is usually considerable pain. Its most common location is the lid margin and the outer commisure. The occurrence of this growth has as its main differential characteristics from lues pain and its occurrence in elderly people.

4. Hordeolum internum is not unfrequently associated with enlargement of the pre-auricular or even the submaxillary gland. The outstanding differential feature here is that the enlargement accompanying hordeolum is painful, whereas in lues the enlargement is quite painless.

5. We have the acute processes to consider, such as gonorrheal conjunctivitis, etc., but this is more apt to be in the nature of a bubo and the nature of the acute process is such as to be readily distinguished.

6. Emphasis may again be made on the invaluable assistance given by the laboratory aids in doubtful syphilitic affections of the lids. Their order of importance are, the spirochetal findings, the Wassermann, and lastly the luetin test.

Alter employs old salvarsan intravenously, and gives the injections one month apart; usually two or three injections suffice. This is supplemented and re-inforced by well-known inunctions of unguentum hydrargarum and potassium iodide in tertiary lesions, depending more, however, on salvarsan and rapid mercurilization.

Keratosis Nigricans. A case of this rare condition—only fifty cases are reported—is recorded by E. T. Boyd.[2]

A woman, 54 years old, complained of epiphora and that her eyes caused her much mental anguish because of their unsightly appearance. On the margin of the right lower lid were two large papillomata, their bases merging. There was also a large papilloma at the inner corner of the right upper lid. In the inner corner of the left eye, arising from the caruncle, there was also a large papilloma and it was this one in particular that was giving her most trouble.

Two years before, being troubled with constipation and hemorrhoids, she, at the suggestion of a friend, began using injections of salt and water, using, according to her statement, "salt by the handfuls." This she did once or twice a day for a long period of time. Then her

(2) Ann. Ophthal., July, 1915.

mouth began to trouble her. Ten months before papillomata began to appear on the extensor surface of the forearms, to a lesser extent upon the arms, and in great profusion upon the back of her neck. In the latter situation there remained marked pigmentation. There was a papilloma in one external auditory canal and a mass, probably papillomatous, in the roof of the mouth well forward and flush with the biting surface of the teeth, that had the appearance of fine-grained granulation tissue. She had lost thirty pounds in the ten months and was in a deplorably despondent mental state, so that it was difficult to say whether this loss of weight and her cachectic appearance were entirely due to a cancerous lesion or were the result of mental worry.

The disease is, in all probability, following Crocker's classification, keratosis nigricans, or, following Stelwagon, acanthosis nigricans.

Couilland and Darier believe that the disease is a syndrome dependent upon abdominal carcinosis and characterized:

1. From a clinical viewpoint, by: (a) a papillary hypertrophy and a cutaneous pigmentation having an essential regional character; (b) papillary hypertrophy of the mucous membrane; (c) dystrophy of the hair and nails; (d) absence of desquamation; (e) existence of cachexia.

2. From a pathologic standpoint, by carcinomatous degeneration of the abdominal organs.

3. Histologically, by lesions of hypertrophy and pigmentation in the rete and corium.

Treatment may be either expectant or surgical; but from the standpoint of the ophthalmologist when the eye or eyelids are involved there can be but one course to pursue, and this coincides with the advice of Crocker in treating of keratosis nigricans, when he says: "Remove any wart or papillary growths which, from their position, are a special annoyance."

It is not impossible nor unlikely that the absorption of large quantities of sodium chloride over a long period of time may have so modified metabolism as to have become the prime etiologic factor in this case.

Blepharochalasis. Two cases are reported by Edward

Stieren,[3] both in girls, who developed the disease at the age of puberty. One was seen about seven years later and presented the disease in the atrophic stage. The other patient was a girl of 14. The edema of the lids began at about the time of puberty between her eleventh and twelfth years. The lids were still in the edematous stage, but the upper lid integument was lax and had the characteristic wrinkled tissue-paper appearance. The older girl, who was 19, had an abundant redundancy of tissue of the upper lids, the skin drooped to the ciliary margin and presented the characteristic wrinkled tissue-paper appearance. Two years after she was first seen, she came in again, when the redundant skin was hanging down over the eyelashes. It was rough, scaly and so lax that it could easily be stretched over the lower lid. Subcutaneous masses, not present two years earlier, could readily be felt and could be reduced backward into the orbit, only to prolapse again when pressure was removed. she was operated on. The integument, 5 cm. long by 2.5 cm. wide, with subcutaneous tissue, was removed; and five nests of adipose tissue, each in a capsule, also were removed. The remaining cellular tissue was gathered together and sutured with chromic catgut to the periosteum of the orbit. The skin wound was sutured with silk. Practically the same operation was performed on each eyelid. The cosmetic result was very satisfactory.

Tarsorrhapy. A modification of the usual operation is given by A. Elschnig,[4] who performs it under local anesthesia with 2 per cent. cocaine or novocain solution and adrenalin: After insertion of Jaeger's spatula the intermarginal section is made to the extent of the intended shortening, and the medial end of the conjunctival plate is incised for from 3 to 4 mm. vertically to the lid border. In this depth both plates of the lid are separated in the intermarginal section up to and under the external canthus. The inner portion of the external plate, with preservation of the lashes, and the internal plate, in its whole width, are pared. In the same fashion the upper lid is split into two plates. Then the free corner of the inner plate of the upper lid is grasped with toothed forceps

(3) Ann. Ophthal., October, 1914.
(4) Zeitschr. f. Augenheilk., 33, p. 280.

and by a cut, first parallel to the lid border, then turning downward in form of an arc as far as and under the external canthus, the triangular piece of the inner lid plate, thus circumcised, is entirely removed. Hence a triangular defect of the inner plate of the upper lid results whose apex lies under the external canthus, and whose small base is formed by the lateral edge of the intact inner plate. After paring the external plate up to the canthus in the same way as in the lower lid, the inner plate of the lower lid is drawn into the defect by a double armed loop; 2 mm. from the pared margin of the prepared inner plate of the lower lid both needles are successively inserted from the conjunctival surface and from behind pushed out about 4 mm. above the row of the lashes of the upper lid. The thread is at first drawn slightly and, after uniting both external plates by two or three sutures, it is tied over a piece of gauze.

DISEASES OF THE CONJUNCTIVA.

Grain of Rice in the Palpebral Conjunctiva. This curious foreign body was found by J. M. Penichet[1] in a patient who felt as though a foreign body had entered his eye. The disturbance had diminished by the time he reached the oculist first consulted, who found only a traumatic conjunctivitis of uncertain origin. The treatment lasted five weeks, at the end of which time Penichet himself diagnosed a chronic conjunctivitis. At a second examination, however, the upper lid was everted more thoroughly than before, and at the deepest part of the cul-de-sac was seen a white point which was taken for a minute abscess. On incising it with a small bistoury, there escaped three-fourths of a grain of rice. The rest of the grain fell out three days later.

A "naturalist friend" stated that the grain of rice had swollen, that its envelopes had begun to break, and that the rootlets were unfolding themselves within the grain.

Tuberculosis of the Bulbar Conjunctiva.* This case

(1) Cronica Med. Quirurg., September, 1915.

*See also abstract of article by W. E. Gamble on "Epibulbar Tuberculosis," page 57.

is reported by F. Libby[2] in a woman, aged 40. She was first seen June 17, 1912. Two months previously the cervical glands on right side became enlarged; a month later the inner half of the bulbar conjunctiva of the right eye became red during sleep. On inspection four small, pale, firm, whitish-red nodules were found in the conjunctiva over the attachment of the internus; a larger one behind and above these, and also a large, firm, deep-red nodule under the somewhat infiltrated plica and pushing it forward. Examination of smears and scrapings from the nodules did not reveal the tubercle bacilli. The apex of the right lung was slightly infiltrated.

Tuberculin was given hypodermically every five days. A focal reaction was noted after the first injection and subsequently when the dose was increased. July 30, two pale, flat-round, yellowish nodules appeared below the others. By August 6 there had been slight general improvement. About this time sun baths were ordered for the enlarged glands in the neck and exposures of ten seconds daily were begun for the conjunctival nodules and this gradually extended to sixty-three seconds. Later this was ordered repeated for from two to six times a day. On September 3 considerable improvement was noted. The tuberculin was being administered regularly every five days. On September 9 the exposures were increased to three minutes and twenty seconds. The conjunctiva became intensely inflamed on September 30, and pseudo-diphtheria bacilli were found in the discharge. The sunlight treatment was omitted for two weeks; then resumed for one week and finally discontinued, as it seemed to cause irritation. A second infection occurred October 21, but yielded in a week to treatment as did the first. By November 4 weight had increased five pounds, and the glands were improved. From this time the conjunctival nodules gradually subsided and six months later a cure had occurred. In July, 1913, the glands in the neck again became enlarged and the eye flared up, but it soon subsided and the patient resumed her work as a teacher.

Trachoma and Its Treatment. A profitable discus-

(2) Ann. Ophthal., October, 1914.

sion of this ever important topic is carried on by L. Webster Fox.[3]

The principal object of his paper is to describe the grattage operation. Two instruments have been especially devised for this procedure, a forceps and a scarificator. Any operation that has for its aim the destruction of the granulations must be commenced by a complete exposure of the palpebral conjunctivae, including the retrotarsal folds and the cul-de-sac of the upper lid. This is best effected by means of the Darier forceps, an instrument that resembles a catch-dressing forceps, with three pins on the male blade. When the instrument is closed, the pins pass through corresponding openings in the opposing, or female, blade; and their points, piercing the eyelids, prevent slipping when complete eversion of the lids is made. The second instrument is a tri-bladed scarificator, or scalpel. The outside blades are jointed so that they may be easily turned when being cleaned. They are securely held in place within a platinum handle, and make parallel incisions. The operation is performed in the following manner:

The upper eyelid is grasped along its margin by means of Darier's forceps and, the edge being turned upon itself, the lid is everted until the retrotarsal fold is brought into view. A horn spatula should be inserted beneath the lid, to protect the cornea. The exposed conjunctiva is first thoroughly scarified with the three-bladed scalpel. The granular tissue is then scrubbed with a tooth-brush that has been steeped in a corrosive-sublimate solution (1:1000) just before being used. Immediately after scrubbing, the part is washed with a solution of the same strength. Another portion of the lid is then unrolled and the scarifying, scrubbing and washing are repeated. This process is continued until the whole palpebral conjunctiva has been subjected to the treatment. If the lower lid is involved in the trachomatous process, it should be treated in exactly the same way.

In the soft, gelatinous variety of granulations, Fox has found that, by using ordinary gauze sponges, he has been able to smooth down the elevations and clean off the conjunctiva of both lids, leaving it perfectly smooth;

(3) Ophthalmology, July, 1915.

so that within a few days, all evidences of trachoma have disappeared. Especial care, however, has been observed to reach the fornix and every other portion of the diseased surface. In addition to cold compresses, an antiphlogistic is applied, and within twenty-four hours the lids can usually be opened without pain or annoyance. It is surprising how little reaction ensues upon this apparently harsh procedure. (Dr. Coover uses sandpaper soaked in sublimate solution, with much success.)

If the operation as described is promptly carried out, the results are exceedingly gratifying; and it rarely happens that it must be repeated, thus proving that reinfection seldom takes place. Fox feels convinced that the disease is a curable one; and that, therefore, a modification in the immigration laws should be made to cover certain cases. For instance, if the father and mother are free from trachoma, and possibly only one child of the family is attacked, the child should not be deported, as the present law demands; because, with proper treatment, the disease can be eradicated.

Treatment of Gono-Blennorrhea. A Siegrist[4] says that since 1907 nitrate of silver has been supplanted at the clinic of Bern by collargol 3 per cent. and syrgol 5 per cent. in the treatment of blennorrhea, as their application does not, like the former, require eversion of the lids, and consists only in instillations. Fifty-three new-born children were treated with collargol, and forty-three with syrgol. The results, not only in ordinary but in cases of severe corneal complications in the new-born and adults, were equally good. Occasionally in the new-born child syrgol caused offensive diarrhea and disturbance of the general condition.

Optochin in Blennorrheic Conjunctivitis. Elena Puscariu[5] reports eight cases of gonorrheic blennorrhea, treated with instillations of hydrochlorate of optochin (ethyl-hydrocuprëin), 1 per cent. every hour and 2 per cent. every two hours, after previous removal of all discharge with lotions of boracic acid. In recent cases and in the later period of the disease the gonococci disappeared after a few days; at the most, treatment lasted

(4) Klin. Monatsbl. f. Augenheilk., 54, p. 288.
(5) Klin. Monatsbl. f. Augenheilk., 53, p. 342.

two weeks. Optochin employed thus was found by this writer to be superior to nitrate of silver.

Conjunctival Tumor Composed of Russel's Corpuscles. This rare, perhaps unique, form of tumor is described and an instance recorded by G. Komoto.[6] A woman, aged 22, showed chronic catarrhal inflammation of the conjunctiva of the right eye and a flat, lobulated, tough, elastic, greyish-white tumor at the lateral, upper fornix. A piece of it was excised, and the histologic findings are described in detail. It presented the aspect of pseudo-tuberculosis, probably from irritation by tobacco dust from the tobacco factory in which the patient worked. It contained plasma and epithelial cells and an immense number of Russel's bodies. These are intensely light refracting, round, hyaline globules of the size of staphylococci or plasma cells, extracellular or intracellular, arranged like mulberries. They are deeply stained by anilin dyes and differ from all other products of hyaline degeneration by their marked affinity for picric acid if stained according to van Gieson's method. They are found in chronic inflammations.

Diffuse Epibulbar and Palpebral Carcinosis of the Conjunctiva. This rare condition is reported by M. McBurney.[7] A woman, aged 67, suffered within the last twenty years from frequent inflammations of her eyes. In the spring of this year the right eye was much inflamed and painful. In the palpebral fissure the right eyeball appeared as a pale reddish nodular ball without demarcation of the cornea and sclera. The lower fornix was of normal depth, but the lower lid of greater resistance and, like the eyeball, plica and caruncle, was covered with the same pale reddish tissue. The conjunctiva of the upper lid showed chronic catarrhal inflammation with papillary swelling. The general examination revealed myodegeneration of the heart with albuminuria, but no sign of an internal carcinoma, and no enlargement of the cervical glands. Exenteration of the orbit under local anesthesia was followed by plastic closure of the orbit with the skin of the lids.

Microscopically, the tumor was a cornified, flat,

(6) Klin. Monatsbl. f. Augenheilk., 53, p. 136.
(7) Klin. Monatsbl. f. Augenheilk., 53, p. 106.

epithelial carcinoma, which started from the lower limbus, penetrating through the perivascular spaces of the anterior perforating ciliary vessels. Its ulceration caused intense reaction: numerous plasma cells and round-celled infiltration, without giant cells, of the adjacent tissues, general congestion, iridocyclitis with anterior and posterior synechiae, obliteration of the sinus of the anterior chamber, infiltration of the choroid and optic nerve, and endophthalmitis. As usual in these cases of flat-celled epithelioma, there were no metastases.

Sarcoma of the Conjunctiva. C. T. Wolfe[8] reports a case and says that this condition occurs most commonly at the limbus as an epibulbar growth, usually pigmented. Only eighty instances have been recorded. Quoting principally from Parsons, he points out that these tumors grow slowly; they occur usually in old persons, though occasionally in young subjects; they are regarded as highly malignant. Of thirty-six cases in which Verhoeff and Loring reported recurrences, metastasis occurred in eight; recurrence in the lids and orbit in four. The consensus of opinion is that primary enucleation should be resorted to.

DISEASES OF THE CORNEA AND SCLERA.

The Palladin Reaction in Parenchymatous Keratitis. P. Christel[1] applied the palladin test in eighteen cases of parenchymatous keratitis, but from this experience he can not attribute a diagnostic value to palladin in the disease, nor does he consider it superior to Wassermann's reaction.

Megalocornea. A number of ophthalmologists, especially Axenfeld and Elschnig, question the clinical existence of megalocornea and maintain that on closer examination of many cases of so-called megalocornea changes will be found to be merely part of an infantile glaucoma. J. Staehli[2] contests this view and reports four typical cases of clinically pure megalocornea, which did not show the least signs of infantile glaucoma. With Horner and Haab, Staehli considers these cases of

(8) Amer. Jour. Surg., August, 1915.
(1) Klin. Monatsbl. f. Augenheilk., 53, p. 391.
(2) Klin. Monatsbl. f. Augenheilk, 53, p. 83.

megalocornea as partially hyperplasia and partially gigantism. Horner observed it in members of the same family, never alternating with hydrophthalmus, and Kayser found it in seventeen members of the same family. Another important point is that there are numerous transitions from the normal sized cornea to megalocornea, which have nothing characteristic of glaucoma. Analyzing the terms glaucoma and gigantism, the writer can not see why eyes should be considered as glaucomatous which have nothing in common with the hydrophthalmic eye but the large cornea, and are in everything else normal, vision, visual field, tension (even subnormal), media, no disturbances at puberty. This does not mean that megalocornea is not pathologic. The spontaneous dislocations of the lens, occasionally fatal to the eye, the early opacities of the cornea in the form of an arcus senilis, the dissemination of pigment from the iris and the deposits of pigment on the posterior corneal surface, observed in cases of megalocornea, bespeak its pathologic character.

A Case of Bilateral, Central, Punctiform, Subepithelial Nodular Keratitis (Groenouw). W. Uhthoff[3] describes a case of bilateral, central, punctate, subepithelial keratitis which was undoubtedly a sample of what is known as Groenouw's nodular disease of the cornea. It occurred in a man, aged 21, who noticed in his fifteenth year an opacity before his eyes and saw, especially toward the sun, small dots. Groenouw at that time diagnosed nodular keratitis and recommended scraping of the central superficial layers. Out of the eight children of his family only three could see well, and an uncle had the same affection, according to the patient. Under the loupe the centers of both corneae showed numerous small, grey foci, mostly round, some linear, under the smooth epithelium. In places they were confluent, giving the appearance of foam. The periphery was free, except some minute dots at some places. Repeated scrapings had no effect, so that Uhthoff abscised the superficial layers with a narrow knife as far as the healthy tissue, over an area 0.33 mm. thick and 2.50 mm. long. The microscopic examination revealed (1) partial focal thick-

(3) Klin. Monatsbl. f. Augenheilk., 54, p. 377.

ening of the epithelial layer with destruction of Bowman's membrane at some places; (2) small foci of partly brittle, partly homogeneous, hyaline masses in the subepithelial strata of the corneal stroma, crowded between the lamellae, partly originating directly from hyaline degeneration of the corneal tissue. The epithelial layer was mostly intact and the stroma essentially normal.

E. Fuchs considers nodular keratitis as a disturbance of nutrition or dystrophy, characterized by excretion of substances not soluble in the tissue juices.

Pigmentation of the Cornea. As the cause of a slight diminution of vision P. J. Waardenburg[4] discovered in a patient's eyes a pigmentation of both corneae and very fine peripherical opacities in both lenses. The patient was a woman, 43 years old, who had V. 5/6. The corneal pigmentation is almost symmetrical, a broad streak of very fine color particles, downward and to the nasal side. The streak occupies about half of the cornea. The upper part which is left free is larger than the lower part. The streak is the broadest (2 to 2, 5 mm.) a little below the corneal center. The pigmentation is peripherically the least dense. The pigment shows clearly against the posterior wall of the cornea.

The writer considers the lens opacities to be a light form of congenital zonular cataract, and the pigment deposits to be congenital melanosis of the cornea.

Bilateral Symmetrical Degeneration of the Cornea. A man, aged 53, had an inflammation of the eyes when 20 years old, which relapsed several times. He came to the clinic of W. Uhthoff[5] in 1897. The affection was then diagnosed as episcleritis, extending into the marginal portion of the cornea. In 1909 he came again with great changes of both corneae, which presented in their marginal portions an almost circular broad zone of a yellowish grey deep opacity, leaving the upper segment free. This had considerably increased in 1913 under occasional inflammatory irritations, only the center and the upper eccentric portion had remained free. Under the loupe the opacity showed deposits glistening like gold, resembling cholestearin masses V=6/8. A super-

(4) Tydschr. v. Geneesk., Feb. 27, 1915.
(5) Klin. Monatsbl. f. Augenheilk., 54, p. 383.

ficial layer was excised and examined microscopically, which is described in detail. The changes consisted in degeneration and the formation of vacuoles and of a reticular tissue between the preserved epithelium and Bowman's membrane. The deeper strata of the corneal stroma showed fibrillar degeneration with clefts and cavities. The deposits consisted of crystals of acid of sodium and of uric acid, which gave murexid reaction. Uhthoff could not find a similar case recorded in the literature. The patient had rheumatism but not gout, except slight nodules at the fingers. The affection of the cornea did not yield to any kind of treatment.

Keratitis Punctata Leprosa. Leprosy of the cornea is rarely seen in America, although it is a well-defined disease and not uncommon elsewhere. T. Axenfeld[6] describes a case in an Italian, aged 25, who returned from Brazil with typical tuberous leprosy, which he kept secret. It was, however, recognized from the condition of the eyes. Years before, the right eye was injured by a foreign body that penetrated the center of the cornea and lens. There was a fine scar of the cornea, narrow pupil, circular synechia to a pseudo-membranous secondary cataract and pericorneal orange-yellowish thickening of the episcleral tissue, constituting a true leproma of the conjunctiva. Under the smooth epithelium of the cornea were minute fine grey dots without any communication with the margin. As this eye was amaurotic and sensitive to the touch it was enucleated. The left eye also showed orange-colored thickening at the limbus and in the episclera.

The microscopic examination of the right eye revealed abundant lepra bacilli in the episcleral leproma, in the isolated grey foci of the avascular portion of the cornea close under Bowman's membrane, and some in the epithelium, without connection with the vascular margin, without new-formed vessels and without infection from outside. How were these foci metastases of immovable bacilli possible? Axenfeld considers them to be the result of diffuse spreading in the clefts of the tissue or a transport and localization by cells, *i. e.*, phagocytosis of the living virulent bacilli by migratory cells. The

(6) Klin. Monatsbl. f. Augenheilk., 54, p. 201.

specimens contained very few ordinary leukocytes, but numbers of corneal corpuscles with bacilli, that reminded the writer of the migratory cells of the fixed corneal corpuscles, described by Marchand Göke, Klemensiewicz and others. This is of prime importance in the pathology of the cornea, and suggests the possibility of hematogenous metastases of other germs and other diseases, *e. g.*, in tuberculosis.

Although the cornea, episclera, anterior portion of sclera, iris and ciliary body were invaded by millions of bacilli, the choroid, retina, and optic nerve appeared entirely free from them. This is the rule; the deeper parts of the eye are rarely affected by leprosy, and it is an interesting question why the different hematogenous infections prefer their special localities.

Epibulbar Tuberculosis.* W. E. Gamble,[7] speaking of the *therapy of ocular tuberculosis,* in general, reminds us that intra-ocular tuberculosis is endogenous in its origin, and is only one of the tuberculous foci within the organism, and with appreciation of this has come a persistent and sustained effort to treat the patient, as well as the eye itself.

The general surgeon's routine practice of a decade ago, of removing tuberculous tissue wherever found possible (joints and glands) has given place to a more conservative treatment, owing to the fear of general dissemination of the disease. Ophthalmologists have learned that operations involving the inside of the eye, as iridectomy to remove tuberculous foci in the iris, are not only dangerous to the eye, but to the life of the patient. Von Hippel would only undertake extraction of secondary cataract when the tuberculous eye had been free from irritation for two years. In the presence of glaucomatous increase of tension, if the use of myotics does not suffice, he considers Elliot's trephining less dangerous than iridectomy as being an operation of less magnitude and not so likely to occasion scattering of the bacilli.

Such procedures as the injection of air and placing iodoform and other drugs in the anterior chamber are of

---

*See also abstract of article by F. Libby, "Tuberculosis of the Bulbar Conjunctiva," on page 48.

(7) Ophthalmic Record, February, 1916.

doubtful value. In this connection it is significant that in the experimental test by inoculation of the rabbit's eye, with tuberculous tissue the animal usually dies in two or three months from general infection.

The recognition that tuberculosis, especially of the chronic type, attacks all the tissues of the eyeball except the lens, is the fertile field in which the ophthalmologists now are busily working.

In the diagnosis of tuberculosis of the eye the ophthalmologist's ability to see the pathologic changes makes the diagnosis much easier than in other parts of the body. The clinical picture is often all that is necessary to make this complete, as tubercles in the choroid or nodules in the iris; yet we occasionally find obscure cases, the nature of which we are unable to make out with the ophthalmoscope, aided by the history of the patient.

The recognition that many heretofore unknown pathologic changes in the eye are tuberculous has come through the use of the tuberculin-reaction test. This reaction, as is well known, takes a three-fold form. The general reaction is of little practical importance to the ophthalmologist other than that he should appreciate fully the harm it may be possible to do to the organism. The fact that practically all of the human race have been infected with tubercle bacilli and that this reaction is positive in the healed cases as well as in the progressive, explains its uselessness. The skin reaction for the same reason is of little diagnostic value, except when it is repeatedly negative. However, the focal reaction, when it can be obtained, is specific, leaving no room for doubt as to the nature of the lesion.

It is unfortunate that, as now practiced, in most cases it seems necessary to produce the general reaction in order to obtain the focal. However, there is evidence to the effect that the patients who respond to a small diagnostic dose are the ones who respond most favorably to tuberculin treatment, so that small diagnostic doses are gaining favor. A more careful study of the suspected tuberculous area, in the light of what we now know constitutes a focal reaction, makes it unnecessary to use the larger dosage in many cases.

Sydney Stephenson on two occasions produced both

general and focal reaction in cases of chronic iridocyclitis by 1/1000 mg. T. R.

However, it must be remembered reactions general or focal from these small doses are rare.

Gamble has under observation a patient suffering with a deep nodular scleritis (sclerosing keratitis) which has existed several weeks, resisting all kinds of treatment. A tuberculin diagnostic test of 1 mg. O. T. gave no focal reaction. Infinitesimal doses of T. R. have not prevented the eye from being lost. It is now soft and sight is gone. Later in the progress of the disease and before the tuberculin diagnostic test was used, there had appeared innumerable round, slightly elevated yellowish-white spots from 3 to 5 mm. in diameter showing through the conjunctiva, described several years ago by Verhoeff, considered by him as diagnostic of tuberculous scleritis. One of these spots was enucleated. Franklin D. Smith found that "the specimen submitted for examination consisted of a translucent nodule approximately 3 mm. in diameter. The nodule is made up of small round cells, arranged about a non-cellular mass, resembling very much tubercle formation. It is beneath the conjunctiva."

Thus it appears that this subsequent condition is a nodular tuberculous episcleritis, disseminated from the large, deep tuberculous nodule (See the colored frontispiece).

Treatment of Pneumococcus Ulcer. A practical essay on this subject has been written by Maitland Ramsay.[8] He says that first aid in such a case consists in washing out the conjunctival sac with a warm solution of boracic acid, instilling a few drops of a 2 per cent. solution of cocaine, examining the eye carefully by focal illumination, removing any foreign body from beneath the eyelids or from the surface of the cornea, applying an ointment of 1 per cent. atropine, 2 per cent. cocaine and 3 per cent. iodoform, and covering the eye with a carefully adjusted compress and bandage.

The technique of further treatment is as follows: Ethylhydrocuprein hydrochloride, also known by the trade name of optochin, a white salt readily soluble in water, is employed in 1 or 2 per cent. aqueous solution.

(8) Ophthal. Rec., September, 1915.

Before it is used, the floor of the ulcer should be thoroughly washed with a lotion, containing chinosol (1 in 4,000), or quinine hydrochloride (3 grains to 1 fluid ounce), diluted with an equal quantity of warm water, and the boundaries of the ulcer should be outlined by staining with an alkaline solution of fluorescein. This done, a swab of sterilized woolen cotton of sufficient size to cover the whole of the ulcerated surface, and saturated with a 1 per cent. aqueous solution of the optochin, should be applied to the ulcer, and kept in firm contact with its floor and margin for about two minutes. Should the patient be sensitive, it is well to instill cocaine drops beforehand, because the application of the optochin causes sharp burning pain lasting for from five to ten minutes. That irritation, however, soon lessens, and by the end of fifteen minutes there is complete anesthesia of the cornea, which will last for fully half an hour. These applications should at first be repeated two or three times daily, the good effect being maintained by instilling a few drops of 1 per cent. solution of optochin every hour during the days, while, during the night, a 1 per cent. optochin and atropine ointment may be applied as often as possible without interfering with sleep. Ethylhydrocuprein is often applied by simple instillation alone, but the use of the swab and the hourly instillations combined will be found much more efficacious and satisfactory.

The Treatment of Corneal Fistula. Discussing his well-known treatment of this disease H. Kuhnt[9] maintains that the unfavorable criticism of his operation by Meller was due to the fact that Meller did not follow his directions. Every rational therapy demands an early closure of the fistula. This can only be attained by removal of the epithelial layer of the canal and the union of the pared edges by implantation of a nearly related tissue. Kuhnt uses conjunctival flaps with one or two pedicles, which are pressed into the fistula by a probe and held there for a few minutes. In young persons the reunion and cicatrization follow at once without reaction. In older persons Kuhnt found a paracentesis at the opposite corneal margin serviceable for lowering the

(9) Zeitschr. f. Augenheilk., 32, 421.

intra-ocular tension. He had excellent success in eleven peripheral and eight central fistulae. Only in three was it necessary to repeat the operation. He therefore warmly recommends this method on account of its simplicity, ease of performance, and certain results.

THE CRYSTALLINE LENS.

Congenital Aphakia. Previous authors have not, according to W. F. Hardy,[1] accorded a distinct place to aphakia among congenital anomalies, and this action is probably due to the doubt of genuineness in the cases reported, or because of the over-shadowing concomitant defects. While congenital aphakia should receive mention under the subject of the lens, it is questionable if enough evidence is at hand to justify classifying it among true congenital anomalies, especially if one adheres rigidly to the interpretation of an anomaly as a non-development or mal-development, and not as the result of distinctly pathologic processes.

Cataract.

A Successful Method for the Removal of a Fully Dislocated (Lost) Lens. Howard S. Paine[2] describes his extraction of a *lens totally dislocated into the vitreous,* and shows how successfully to remove lenses fully dislocated and floating about or lying in the bottom of the vitreous chamber, the kind that up to the present have been called "impossible of extraction."

A summary of the advice given by various authorities when dealing with dislocated lenses is given. Paine believes that the failure to operate has been due to the fact that the contents of the globe are invisible to the operator, and that the eyes are diseased eyes and that the speculum as ordinarily employed causes the contents of the eyeball to bulge forward and favors their escape.

He describes the operation in five examples in which the eyes were saved and attributes his good results to having the eye speculum gently lifted (thus avoiding

(1) Ophthal. Rec., July, 1915.
(2) Ann. Ophthal., July, 1915.

pressure) and to good illumination of the interior of the eye during the entire operation. He made an incision and broad iridectomy, could see the lens, and by slipping a Knapp's loop behind it, could lift it out. The first patient had, 18 months after operation, V=20/20 and could read diamond type. His second operation was also successful. The third one presented a lens fully dislocated into the vitreous; after section and iridectomy, it was seized with a Stevens hook, raised up to the incision and a Smith spatula passed behind it, after which it was slid out by pressure applied from the outside of the cornea—pushed, *not* lifted out; the result was excellent. The fourth and fifth cases were equally successful.

C. H. Helfrich[3] agrees with the preceding writer regarding the conduct of the case in which the *lens is deeply dislocated into the vitreous during the extraction of cataract.* Exception is taken to the advice given by Török and Grout in their *Surgery of the Eye* and in Meller's work, *Ophthalmic Surgery* that no attempt should be made to fish the lens out of the vitreous with a wire loop. The writer says it is the American custom to "go after" the lens at once with a loop and get it out, and that the loss of a little vitreous is not a serious matter. He thinks the advice contained in two such prominent books should not go unchallenged.

A Method of Artificial Maturation of Cataract Allowing of Early Extraction. J. G. Clegg[4] has advanced arguments in favor of the following method:

The pupil is dilated with atropine for one or two days before the operation; a paracentesis of the anterior chamber is made by an iris knife at the outer side; the aqueous is allowed to escape; an iris repositor is passed into the anterior chamber, and massage is applied directly to the lens capsule by it, taking care, however, that the capsule itself is not ruptured. Some twenty strokings of the lens capsule are made. After this, further massage is made with a smooth lens scoop applied to the outer surface of the cornea. The movements are made in a rapid way radially from the center and backwards. One drop of atropine is instilled and a bandage applied. During

(3) Jour. Ophthal., Otol. and Laryng., June, 1915.
(4) Ophthal. Rev., June, 1915.

the same day atropine solution is instilled again once, twice or thrice, according to the size of the pupil, and if the next morning the eye is perfectly quiet no further atropine need be used. Very commonly within two or three days definite opacification of the cortical layers of the lens is observable, and in several cases extraction has been proceeded with on the seventh day after the first operation. Extraction should not be resorted to, however, unless the pupil has recovered its mobility and is again of the ordinary size, and unless there is absolutely no sign of irritability, the result of the massage operation.

This method allows a business man, who is becoming incapacitated for his work, to have maturation and extraction done and recovery to take place within the shortest possible space of time. Under the most favorable circumstances he need only be confined to the nursing home or hospital for three or three and a half weeks.

The advantage of having the cortical layers of the cataract opaque at the time of the extraction is obvious, in that the cortex is visible and soft, and thus can be more completely expressed. The less lens substance left behind the better, for it may set up iritis; and certainly a good visual result is more rapidly obtained if it is away.

[The above procedure was advocated, described and frequently practiced by the late Boerne Bettman of Chicago twenty years ago.—Ed.]

The Choice of a Cataract Operation. An illuminating paper on this important subject is that of E. E. Maddox.[5] The writer discusses this question in the light of five considerations: safety, visual result, beauty of eye, brevity of procedure and fewness of operative interferences. He gives the advantages of the preliminary iridectomy and adds that the only disadvantages excepting loss of time is that its cicatrix sometimes balks the subsequent carving of a good conjunctival flap; he believes that this is due to the quite unnecessary size of the usual incision which is most often cut by a keratome 5 to 7 mm. broad. He has endeavored to reduce the incision to its minimum by inverting its figure so as to

(5) Ophthal. Rev., October, 1914.

become like a funnel opening inward instead of outward: the smallness of the opening in the conjunctiva not only narrows the door of infection and promotes rapid closure, but removes embarrassment in cutting a conjunctival flap afterward. After inserting a specially made narrow knife into the anterior chamber a trifle behind the limbus, its point is diverted during its withdrawal, first to one side and then to the other, *about an imaginary pivot in the conjunctival entrance.* This incision really fits the shape of the withdrawn iris better than when the funnel opens outward as made by a triangular keratome. He considers ordinary keratomes too broad for preliminary iridectomy; it is best to use the shortest keratome and make the narrowest conjunctival incision compatible with the two essentials, removal of the iris to its root and inclusion of the uveal layer. To make use of so small an entrance we do best with a blunt Tyrrell's hook. If iris forceps are used they should be extremely fine, with teeth on the lower edge, and the limbs should tend to spring apart strongly. Even then, some practice is needed to enable a deep grip of the iris to be taken, so as to allow no part of the uveal layer to be left behind.

In simple extraction he favors an apical suture of the conjunctival flap and also suggests the addition of two basal sutures, one on each side, close to the cornea; these not only lessen the tendency to prolapse, but limit it to an inconsiderable amount should it take place; the sutures near the cornea may be inserted after the apical one and should be of the finest silk. He thinks Desmarres' bridge operation better still and this renders the apical suture unnecessary though the limbal ones can be employed if desired. The only difficulty with sutures is their insertion which should be effected with the aid of a catchless needle holder; they cause no trouble afterward and generally fall out of themselves within a week; if not, no speculum is needed for their removal.

He recommends trying to secure a small pupil by the use of pilocarpine during such stages of the healing as the condition of the iris permits, sometimes intermitting by a single dilatation.

He has now, however, almost given up an apical suture in favor of the "bridge" operation introduced by Des-

marres in 1851 and revived since then from time to time on the Continent, though never widely adopted; he maintains that it is only very slightly more difficult to express the lens under a bridge than under the usual conjunctival flap, and in suitable cases a bridge possesses the following advantages:

1. A benefit equal to that of sutures without the risk of inserting them and a more natural degree of traction on the flap.
2. The vitality of the flap is maintained including its anti-microbic powers.
3. The nutrition of the cornea is kept up.
4. The upper eyelid can not engage in the incision or disarrange the flap.
5. The safer and more rapid union permits greater freedom to the patient.

Its value is greatest in prominent eyes and old subjects; in deep-seated eyes with a small palpebral aperture it is not wise to attempt a bridge. Its two disadvantages are that cortex is evacuated with greater difficulty and the speculum cannot be removed before expelling the lens since the surgeon needs both hands free, one to govern the bridge and the other to extrude the lens.

He makes use of a modification in the shape of the bridge and cuts it from the more nasal portion of the corneal flap, making at the same time the temporal edge of the bridge longer than the nasal. This leaves the half of the incision which is most exposed to infection from the canaliculi, more covered than the other, and it includes the important apex as well (important because of the movement of the eyelid), though not necessarily extending more than between one and two millimeters to the temporal side of it.

In maneuvering the lens out, he grips the bridge of conjunctiva from the front by fine forceps and draws it forward and downward; or he grips the temporal edge of the bridge 3 or 4 mm. from the cornea, and after lifting it away from the eye to begin with, allows the lens a start and then draws it down and in so as to enlarge the exit while the lens is escaping, the bridge being made to follow the lens and immediately close the incision behind it. If the extraction be a simple one,

and the patient sufficiently well behaved, the temporal edge of the bridge, near the cornea, may be sutured to the conjunctiva with advantage; if, on the other hand, a combined extraction be contemplated, the bridge can be made a shade more nasal still to allow room for the iridectomy.

He discusses the requisites of a good lavage apparatus which is especially important in the bridge operation but should be on hand during every extraction. Such an apparatus should comply with the following principles: (1) It should lie in the instrument tray and be as easily picked up as other instruments; (2) it should need the surgeon's hand only; (3) the pressure should be capable of graduation by the surgeon; (4) it should be easy to boil the apparatus and preserve the nozzle from contamination while waiting for use; (5) foreign particles should not enter the anterior chamber. Hence rubber should not touch the solution and consequently rubber tubing is objectionable since rubber particles may come away; the same is true, though in less degree, of rubber bulbs. The safest appliance in present use is an undine, to the end of the spout of which a metal nozzle is directly attached, with no intermediation of rubber. The writer has designed an appliance with a rubber bulb to allow the surgeon to vary the pressure himself, but the bulb is *inverted*, lest dust should fall from it, and is so arranged that the liquid never reaches it. The whole thing can be boiled in the sterilizer, and a metal nozzle of any desired shape be attached as to a hypodermic syringe. Care should be taken to have the liquid used free from the most minute particles, the corneal loupe being used to detect any such floating dust. While the lavage apparatus should always be ready, the writer thinks the less it is used the better, for the anterior chamber is utterly unaccustomed to foreign liquids, and the healing lymph which so quickly begins to ooze from the lips of the incision is not improved by dilution.

A New Conjunctival Flap Incision in Cataract Extraction. In operations that require perforation of the globe, and in accidental perforating injuries, the present-day procedure is to cover the corneal or the scleral wound with some form of conjunctival flap. A. E.

Ewing[6] describes a new method of obtaining such a flap which requires the use of the double fixation forceps; with this forceps the conjunctiva, over spaces from 5 to 7 millimeters wide to either side of the cornea, is grasped in such a way as to cause the loose conjunctiva to fold moderately over the corneal margin. The corneal incision is made as usual just back of the clear cornea and this will naturally involve the folded conjunctiva. This provides a conjunctival covering to the corneal wound at the entrance of the knife, and at the exit of the counter puncture, which cannot be obtained in the ordinary conjunctival flap method, except by placing the corneal incision dangerously near the ciliary border; while in the nasal and the temporal quadrants of the wound, if the apex be vertical, the flap spreads out from the cornea like small wings, as a corneal protection.

The employment of the lance-shaped keratome renders the procedure practically subconjunctival, as there is no division of the conjunctiva at the nasal and temporal angles. Also the shortest portion of the flap is at the center, where it is most to be desired to facilitate the iridectomy, the removal of the capsule and the expulsion of the lens.

Cataract Incision Leaving Undetached Conjunctival Flap With Bridge of Conjunctiva on Temporal Side. This procedure is fully described and recommended by Frank Todd.[7] After puncture and counter puncture have been made, the handle of the knife is turned downward so that the end of the blade on the nasal side does most of the cutting, though the heel of the knife is allowed to cut to some extent. As the incision proceeds, the point end of the knife is allowed to do the cutting. The incision is carried well up on the eyeball in the conjunctiva, so that when it is completed, the nasal excision extends well up above the center of the cornea, ending in the median line of the cornea or to the temporal side. The temporal incision is very short, perhaps about twice or thrice the width of the knife blade, in fact just wide enough to permit the incision to come completely through the sclera at or near the corneoscleral junction. Thus a

(6) Amer. Jour. Ophthal., April, 1915.
(7) Ophthal. Rec., August, 1915.

considerable bridge of conjunctiva is left on the temporal side. Counter pressure may thus be readily made without placing the spoon underneath the conjunctival

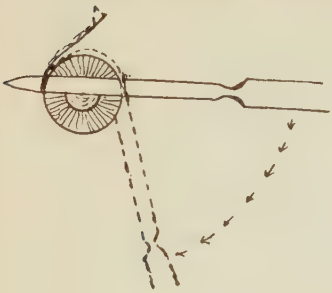


Fig. 1

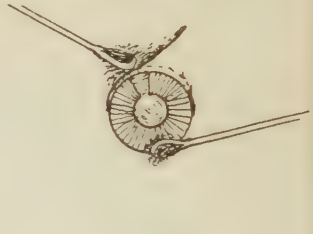


Fig. 2

Fig. 3

Fig. 2. Frank Todd's Operation for Cataract.
Fig. 1. Handle of knife on temporal side. Dotted line knife represents final position of knife, which has come through sclera at dotted line and then passed under conjunctiva leaving the latter uncut on the temporal side.
Fig. 2. Showing how pressure and counter pressure may be made in the usual manner.
Fig. 3. Showing how the lens may be wheeled out with the spoon if it hesitates under the conjunctival flap.

flap, and delivery is quite simple through the larger (nasal) opening.

Extraction of Cataract in the Capsule After Subluxation With the Capsule Forceps. Arnold Knapp[8] reports the results in 100 successive cases operated on in this way. He employs the Kalt capsule forceps, the extremities of which are flattened, cup-shaped, and without teeth, and after grasping the capsule is able by gentle manipulation to subluxate the lens and extract it in the capsule with very slight external manipulation and little trauma to the eye. If the capsule be torn, in

(8) Archiv. Ophthal., January, 1915.

grasping it with the forceps, a portion of the anterior capsule is removed and the operation completed by the old method. A large corneal section is made and an iridectomy done. The capsule forceps are introduced to a point below the center of the pupil, the capsule grasped and the lens dislocated. Pressure is then exerted in the lower part of the cornea with Smith's hook and the cataract delivered after the method of Smith.

The author adds that dislocation with the forceps succeeds in from 40 to 50 per cent. of the cases, and generally fails in cataracts in which the capsule is very thin and the subcapsular opacity is an uneven bluish white. The dislocation takes place easily in hypermature and sclerosed lenses, many of the latter being quite immature.

Delayed Healing of the Wound in Cataract Extraction and Its Proper Treatment. D. T. Vail[9] describes the condition and discusses the theories as to the *causation of delayed healing in the three general kinds of sections.* He says he is prepared to believe that the real cause is an involuntary spastic contraction of the orbicularis palpebrarum muscle or a localized convulsive tic affecting this muscle, which by its alternate contraction and relaxation presses the convexity of the cornea, thus flattening it to a certain extent and causing the aqueous to spurt through the wound in little gushes. At least in a case which follows, his first case reported, he discovered the entire process by actual observation, and noted the prompt cure following tenotomy of the orbicularis muscle. The forces at work to bring about this delay in healing are: First, minus tension due to the operation and, possibly, local shock following it; second, the recumbent position, permitting the weight of the eyelids to fall sheer on the collapsed cornea; third, involuntary winking and twitching movements that disturb union; fourth, distinct spastic fibrillary and cramp-like contraction of the orbicularis palpebrarum muscle. To these he adds too frequent and meddlesome inspection. The operation for relief of the condition is done after injecting a drop or two of sterile cocaine (4 per cent. solution) upward and downward into the tissues above and below the external canthal ligament. A strong pair of sharp-edge blunt-point scis-

(9) Ohio State Med. Jour., December, 1914.

sors are used to sever the orbicular muscle from its attachment, *not outward in line with the palpebral fissure, but at right angles to it; viz.*, directly upward and downward. A moist antiseptic pad is then applied. The bleeding is insignificant. This slight operation was not complained of in any of his cases. He reports three cases promptly cured by this method.

Prevention of Post-Operative Infections After Cataract Extraction. K. Lindner[1] reports his investigations of streptococci in the conjunctiva of cataract patients according to the method of Elschnig-Ulbrich, which were begun in 1911 and continued for one and one-half years. Out of 705 patients operated on for cataract, 470 were examined by this method. Two hundred and twenty-eight, 46 per cent., were positive, *i. e.*, after 24 hours the cultures showed streptococci. One hundred and fifty-nine of these patients were operated on as clinically clean cases the same morning in which the material was taken from the conjunctiva, twenty-one one or two days later; in thirty clinically unclean cases the patients were operated on later after having been treated. On the whole 210 with positive streptococcus cultures and 260 negative cases were operated upon; 470 in all.

Six of these patients developed iridocyclitis which healed, three were affected by iritis with hypopyon, of whom two lost the sight, and three had panophthalmitis. Four out of the six gave negative bacteriologic findings. The three cases of hypopyon iritis showed negative cultures after 24 hours. A re-examination of the original tube of one, after the onset of infection, gave, however, a positive result. In two of the three cases of panophthalmitis (all due to pneumococcus infection), the cultures after 24 hours were negative with regard to streptococci; but one of these was positive when the original tube was again examined five days later.

The writer concludes from these investigations that the method of Elschnig-Ulbrich is not sufficient for detecting all streptococcus bearers as such, and that in a considerably higher percentage of conjunctivae than so far supposed streptococci must be present. Most likely streptococci are constant guests of the senile conjunctiva.

(1) Archiv. f. Ophthal., 88, p. 415.

If their presence can not be proved their number is probably small. The danger of infection is perhaps greater in patients with positive cultures than in those with negative cultures. Lindner emphasizes the fact that the artificial conjunctivitis produced by the previous treatment of streptococcus bearers with clinically clean conjunctiva may aggravate the danger of infection.

Expulsive Retrochoroidal Hemorrhage Following Cataract Extraction. An example of this accident, or rather calamity of ophthalmic surgery, is reported by H. M. Starkey.[2] He very properly points out that this accident is fortunately rare, but is one of the most distressing complications that the surgeon ever encounters. It occurs in one in 8,000 or 10,000 operations involving a section of the eyeball, and causes immediate total loss of sight and frequently complete destruction of the eye. It is one of the accidents that adds years to one's life in a few minutes of time. Mrs. W., aged 87, exhibited a commencing central opacity of the right lens on April 20, 1906, and a little later cataract also began to develop in the left eye. The latter progressed until, in 1913, there was good perception and projection in the right, while in the left scarcely sufficient sight remained to enable the patient to get around her own house. Incidentally it may be mentioned that during this time a hyperopia of 2.D. was converted into a myopia of 4.D.

During the past few years the patient's general health had been rather precarious, and while operation was frequently requested, consideration of it was postponed from time to time until the health should continue favorable for a longer time. During the first part of 1914 the condition steadily improved until by July it was felt that the desired operation might be permitted.

There was nothing in the patient's condition to cause more fear of hemorrhage than in the average patient, but rather the contrary. Her arteries were not degenerated, her physician having stated that the arteries were more like those of a woman of 65 than those of one of 87. The blood-pressure a short time before the operation was 130 and never seemed much above that.

It was decided that the greatest safety lay in a pre-

(2) Ophthalmology, July, 1915.

liminary iridectomy, and this was accordingly performed. The patient was quite nervous about the operation and made a sudden movement as the section of the cornea was about complete, so that the point of the keratome punctured the capsule, but a good iridectomy was made. The patient suffered a rather severe shock with nausea and vomiting lasting a day or two, but made a good recovery with satisfactory coloboma and white sclera, so that in a month after the iridectomy it was considered advisable to proceed with the extraction. The operation was typical, the section being smooth and ample and the lens coaxed out with a minimum of pressure or other manipulation. The speculum was removed and the patient, who had behaved very well, was told that the operation was over and that she should rest quietly with lightly closed lids for a few moments, when the eye would be dressed and she could return to her room. Very quickly a little vitreous appeared between the closed lids, the patient commenced to groan with pain, more vitreous and then blood appeared and then the hemorrhage became quite profuse and pain very severe. This hemorrhage lasted perhaps five minutes. It was impossible to tell just what ocular tissues were present in this escaping blood.

The patient suffered very severe shock and was so reduced that death seemed imminent for several days. She gradually improved, but even after two months, was so weak that she could not sit up at all.

The eye healed in a few weeks and there is now little irritation in it. The upper part of the cornea is opaque, but there is slight atrophy of the globe, showing that not all the contents of the eye were expelled.

[The Editor has had two such terrible experiences—both following cataract extraction—in some 2,600 cases in which he has operated in the past 25 years.]

Treatment of the Early Stages of Senile Cataract. Col. Henry Smith[3] believes that the surgeon should make an effort to check the advance of senile cataract. He says that, given a patient who is sound, apart from this stage of cataract, with distant vision reduced to 6/8th, 6/9th or 6/10ths, 25 minims of a 1 in 4,000, 5,000 or 6,000 solution of cyanide of mercury, according to the age of

(3) Ophthal. Rec., October, 1914.

the patient (the younger the patient, the stronger the solution required to produce the standard reaction) should be injected sub-conjunctivally. The patient should be under the influence of cocaine (or acoin) locally, and having had a hypodermic of morphine up to half a grain an hour previously. This treatment will, in the writer's experience, within a month of the injection, bring the patient's vision back to 6/6ths or even 6/5ths, and at the end of three months he will be one line better on the test card.

Post-Operative Insanity in Ophthalmic Cases. A. O. Pfingst[4] affirms that mental disturbances follow operations on the eye more frequently than they do operations on other parts of the body. That the severity of the operation also does not stand in any causative relation with the development of psychoses is evidenced by the frequency of disturbances after operations on the eye, which as a rule are not severe. Pfingst reports two cases of psychoses following cataract operation. The following conclusions are offered:

First. Post-operative insanity does not occur in individuals mentally sound; there is a pre-existing unstable nervous system and the symptoms merely become manifest after the operation—the latter acting as the exciting cause.

Second. The cases nearly all occur in senile subjects, and younger subjects with analogous symptoms nearly always have atheromatous blood-vessels or diseased kidneys.

Third. The most probable cause of the predisposition lies in an atheromatous condition of the blood vessels and possibly in diseased kidneys with resulting intoxication—hence these cases are more properly senile or toxic (renal) insanities than post-operative or dark-room deliria.

Fourth. All cases of mental abberation associated with hallucinations, etc., even though they be of short duration, may be looked upon as cases of true insanity—differing only in severity and nature of the symptoms.

Fifth. Psychoses may occur after any kind of operation, but that they are especially prone to follow opera-

(4) Jour. Ophthal. and Oto-Laryngol., June, 1915.

tions upon the genitals and the eyes and more especially cataract operations.

Sixth. Insanity occurs perhaps once in every 400 to 600 cases of surgery, including ophthalmic surgery, and occurs once in about every 200 or 300 cases of cataract extraction.

Seventh. The psychoses following ophthalmic surgery do not differ materially from those after general surgery.

Eighth. Many of the cases are of brief duration, two to four days, but some last months or years, or the patients may even become permanently insane. A small percentage of patients die as a result of the nervous affection.

DISEASES OF THE UVEAL TRACT AND VITREOUS.

Slit Pupils in Man. C. Tamanscheff[1] describes the pupils of a woman, who had become blind in the left eye from hereditary juvenile glaucoma. They had the shape of a horizontally placed myrtle leaf, the vertical diameter being two-thirds of the horizontal diameter. Most likely the glaucoma and the slit pupils were caused by anomalies in the canal of Schlemm, in consequence of abnormal growth. From a review of literature the clinical picture and the embryologic conditions allow the following conclusions:

The slit pupil is the result of two atypical colobomas in the same eye. The origin of the colobomas is the indentations of the pupillary margin of the secondary ocular vesicle, described by von Szily in human embryos of 4 weeks, which are not connected with the fetal cleft. They are caused by vascular strands of connective tissue. Abnormal conditions of growth of the mesoderm seem to play an important part in the development of these malformations.

Anatomy or Pathology of Aniridia. According to Cirincione,[2] aniridia has been known since 1820. Morrison showed the first case of this condition at the *Société*

(1) Klin. Monatsbl. f. Augenheilk., 53, p. 93.
(2) La Clinica Oculistica, January-February, 1915.

du cercle médicale de Paris. The diagnosis was doubted, and a commission was appointed to examine the case. It was that of a three-year-old child, sound in other respects, whose eyes showed large and bright pupils through which a red glow could be seen coming from the fundus. The vision was restricted to seeing large objects. The commission decided that the diagnosis of aniridia made by Morrison was incorrect, and concluded it was a case of congenital mydriasis. Later observations, however, confirmed the opinion of Morrison, and many investigators have dedicated themselves to finding out the cause of this singular anomaly. Slowly the record of cases multiplied, but there were diverse opinions in regard to the embryologic and pathogenetic origin of the condition. The following hypotheses have been advanced to explain this condition:

1. The iris is normally developed before the process of absorption, which causes the disappearance of the pupillary membrane, is extended to the iris stroma.
2. The iris is arrested in development by reason of intra-ocular changes occurring in fetal life.
3. The iris can not develop for a mechanical reason which is the contact of the crystalline lens with the posterior surface of the cornea, whereby it is made impossible for the uveal lamina to be thrust between the cornea and the lens.
4. The aniridia is the consequence of an arrested development in the retina.

The writer cites a large number of cases observed by others, with the clinical and pathologic findings, analyzes their conclusions and cites his own experience, which consists in a study of two cases—one, true aniridia, and the other, incomplete aniridia.

The first patient was a man of 21, the latter a man of 59. His description of his findings are painstaking, and to this contribution he has added colored drawings showing the histologic findings, which are admirable. He sets forth the following conclusions as showing the common characteristics of aniridia vera:

1. Rudimentary iris in the form of a triangle with a large base.
2. Crystalline lens diminished in size and opaque in

that portion which corresponds to the posterior pole and in the center.

3. The ciliary body slightly developed with rudimentary ciliary processes.

4. The scarcity of retinal vessels and possibly hyaloid remnants in the vitreous.

5. In all these cases the epithelium of the ciliary body is found normal; likewise the zonular fibers which proceed from it.

6. In none of these cases, not complicated by later changes, is any newly formed connective tissue found, nor cellular infiltration, nor atrophy which could possibly justify suspicion of the presence of inflammatory processes during fetal life.

A Pupillary Phenomenon. U. S. Bird[3] gives the following account of a man, aged 21, with the history of a motorcycle accident about a week previous. Following this he became unconscious, remaining more or less comatose since. The only external evidence of injury was a bruise on the right side of the face. The right pupil was said to be dilated. He had pronounced Cheyne-Stokes respiration. On attempting to examine the right fundus Bird noticed that the pupil was at times dilated and then contracted. The fundi were practically negative. The left was normal, while the right showed a cupping at the lower temporal edge of the disk. This, apparently, was not a factor in the pathology under consideration, but suggested a congenital or other independent condition. There was no suggestion of choked disk. The pupillary condition, however, excited his curiosity. Closer observation discovered a rhythm in the contractions and dilations, which was finally associated with the Cheyne-Stokes cycle. The pupils were insensible to light. On the beginning of the labored, snorting inspirations which initiated the Cheyne-Stokes cycle, the pupils began to dilate, reaching a diameter of about 6 mm. in a few seconds. As the force and depth of the inspirations lessened the pupils contracted, until with the practical cessation of respiration they were about 1 mm. wide. How soon after the accident this phenomenon appeared is not known. This patient's skull was opened two hours

(3) Ophthalmology, October, 1915.

after Bird saw him, and a clot extending across the base, more on the right, was removed. A permanent dilatation of both pupils is said to have been noted afterward. No bony fracture was found. Three days later he died, two hours after developing a temperature of 108 F. An explanation of this phenomenon may be found by assuming pressure by the clot in or about both carotid canals, compressing the sympathetic fibers against the vessel walls, more or less inhibiting the pupillary function of both nerves. This pressure instead of being constant, the usual condition in intracranial clot, was made intermittent by the effect of the respiratory acts on the intravascular pressure in the carotids, with the pupillary cycle as a result. During the abeyance of respiration the carotid blood-pressure gradually increased to its maximum, increasing pressure being made on the nerve fibers between the vessel walls and the clot, causing approximate total inhibition of the pupillary dilating mechanism, and resulting contraction. On the resumption of violent inspiratory efforts beginning the Cheyne-Stokes cycle, the carotid blood-pressure was reduced, relieving the pressure on the fibers between the vessel walls and the clot, permitting the temporary resumption of the dilating pupillary function. It is hardly probable that the pressure on each side was equal, but the sympathetic functions of the two sides appear to be closely related, accounting for the apparently identical condition of each eye. The postoperative dilatation is analagous to that in shock and collapse. In this case it is explained by the evident sympathetic trauma.

Ciliary Processes in the Pupillary Area. C. A. Clapp[4] gives the history of a child, age 5 months, upon examination of whose eyes the pupils were found immobile to light, dilated slowly with atropine and between iris and lens were seen peculiar fringe-like bodies completely encircling the pupil. They were almost black and about ten in number, with rounded ends, leaving a very small pupillary space, through which the outlines of the nerves could be seen with difficulty and borders seemed somewhat blurred. At times the eyes appeared to follow light. In the center of the right lens a small opacity was noted.

(4) Ophthal. Rec., June, 1915.

In support of supposition that this condition was due to a specific toxin is the effect of mercurial treatment, which produced a marked shrinking in length and number of the processes.

Inflammation of the Uveal Tract Secondary to Infection of Mucous Membranes. In an important and instructive paper Charles Goulden[5] discusses this subject. He first gives statistics of his own cases. In thirty-seven cases of iritis sixteen were due to gonorrhea and nineteen to syphilis. In one hundred and forty-two cases of iridocyclitis a diseased mucous membrane was found in seventy-eight cases, sixty-four of them being due to septic teeth. In nine cases of disseminated choroiditis, one was due to septic teeth, and in four cases of a single patch of choroiditis, all of them were due to diseased mucous membranes, two of them being septic teeth.

The occurrence of an infection of a mucous membrane and an inflammation of the uvea in so large a proportion of cases is at least suggestive, and in many cases the effect of treatment of the mucous membrane on the condition of the eye has been so beneficial that the connection can scarcely be denied. With one or two exceptions he discusses only cases of uveitis that do not end in suppuration. It is these cases that are so numerous, and except in case of syphilis so very difficult to treat; when it occurs in its commonest form, iridocyclitis, it may cause grave damage to the eye by frequent recurrence. These recurrences are common, and with each attack more and more damage is done. After iridocyclitis the next most common cases of uveitis that can be ascribed to mucous membrane infection are those in which a single more or less large patch of choroiditis appears, accompanied by deposits on the back of the cornea. It requires the help of experts to examine all mucous membranes before deciding that not one has an area of possible infection. Very little of the mucous membrane of the gastro-intestinal tract is available for direct examination, so that unless very marked symptoms are present it may be erroneously inferred that parts really diseased are healthy. Bacteriology has helped in certain cases, and the preparation and administration of a vaccine from

(5) Roy. London. Ophthal. Hosp. Reports, XIX, Pt. 3.

organisms discovered has given good results. It must be admitted that there are cases of uveitis in which, after every known method of examination and test, there is failure in detecting a cause.

Goulden takes up the various mucous membranes seriatim. Under the digestive tract the mouth is first considered under two heads, the teeth and the tonsils. Two conditions of the teeth can be accused of causing infection of the uveal tract:

1. Abscess in connection with a single tooth.
2. Pyorrhea alveolaris, in which there is a widespread infection of the tooth sockets.

This sepsis need not appear very severe, and it is not necessary to have an extremely foul condition of mouth to produce uveitis. Cases of uveitis are seen in patients whose mouths on superficial examination appear in good condition, but upon expert investigation the tooth sockets are found to be infected.

Of all the diseases of the mucous membrane, sepsis in connection with the teeth is much the commonest, and consequently we should expect oral sepsis to be the commonest cause of uveitis. Cases are cited in detail to illustrate this condition.

He cites several instances in detail, showing that tonsils may be the cause. The connection between uveitis and so-called intestinal auto-intoxication was raised by Elschnig in 1905. He published a series of cases of iridocyclitis in which indican was found in the urine. This, he insisted, was a sign of perverted metabolism. He found that in these cases by regulation of diet and the administration of intestinal antiseptics improvement of the eye followed when other methods of treatment had not succeeded.

Two forms are mentioned:

1. Iridocyclitis occurring especially in women in whom both eyes are attacked with keratitis punctata, posterior synechiae, and vitreous opacities: This is insidious in onset and relapses are frequent. There is an acetone-like odor in the breath, constipation is present and indican may be found in the urine.

2. Recurrent iritis: This occurs in apparently healthy middle-aged women, and the eye recovers with

or without posterior synechiae. It attacks one eye only, there are frequent relapses, and the disease ultimately leads to blindness.

The author states that he himself has not seen cases of choroiditis due to intestinal auto-intoxication. He cites cases from literature in which the following diseases frequently had some bearing on the inflammation of the uveal tract: gastric-ulcer, dilated stomach, chronic dyspepsia, gastro-enteritis, dysentery, colitis, appendicitis and typhoid fever.

The Respiratory System: The nose, acute and chronic rhinitis, suppuration in the accessory sinuses, otitis media, bronchitis, pneumonia, measles and whooping cough are all illustrated as causes.

Gonorrhea receives much attention. As to the frequency of iritis due to this cause, statistics have been published by various investigators and vary greatly. Sixteen out of thirty-seven cases of the author's were due to this cause. It is almost purely a disease of males and is very rarely seen in females. It requires urethritis to be well-established before the eyes become affected. The occurrence of arthritis together with iritis was remarked by the early observers. Iritis being merely a sign of general infection, it is not surprising that some other structure in the body should be affected. Arthritis usually precedes iritis, and it is such large joints as the knee that become painful and show signs of infection. Polyarthritis may occur. In all of his cases the attack of iritis has been present in one eye first, and in none did iritis appear simultaneously in the two eyes. In several the attack has alternated, but in only one was there an attack of iritis in each eye at the same time. In all at one time or another the disease had affected each eye.

The clinical varieties of gonorrheal iritis are as follows:

1. Slight Iritis: Clinically the usual signs of iritis are present, ciliary injection, dullness of the iris, and the rest. There is but slight tendency to the formation of posterior synechiae, and even in cases which have not received efficient treatment, no synechiae are left, only a few dots of uveal pigment on the lens showing the position of the pupil during the attack. It is remarkable

that precipitates are rarely seen upon the back of the cornea in gonorrheal iritis in any of its forms.

2. Plastic Iridocyclitis: This is much more severe and more commonly observed. The injection of the conjunctiva, edema of lids and discoloration of the iris are marked, and there is the tendency to considerable exudation into the pupillary area and formation of broad posterior synechiae. These cases, if neglected, lead to complete synechiae of the pupillary margin, grayish membrane in the pupillary area, and in some cases to grave nutritional changes in the eye resulting in lowered tension.

Being the most common type of gonorrheal iritis, it is the form commonly seen in relapsing iritis, and in its early stages often causes great difficulty in treatment, as it is found very difficult, even with the most energetic treatment, to dilate the pupil satisfactorily.

3. Exudative Iridocyclitis: This is the type described by Mackenzie as typical of the iritis of gonorrhea. The characteristic feature is the profuse exudation of lymph into the anterior chamber. It collects in the lower part of the eye as a translucent mass with a more delicate convex upper border, almost filling the anterior chamber. Under vigorous treatment recovery is complete and all traces of exudation disappear.

4. Hemorrhagic Iritis: In this form hemorrhages occur in the anterior chamber. The author gives the histories of a number of his own cases.

There is reason to think that all these patients who have relapsing iritis without re-infection from outside are really all the time reinfecting themselves from an uncured condition of the deep urethra, chronic urethritis and chronic affections of the prostate, vesiculae seminales and Cowper's glands. Certainly it is now proved that a urethra may remain infected for over thirty years, and gonococci have been discovered in centrifugalized urine at this date after the primary infection.

Uterus: The recurrence of inflammatory disease in the eye due to uterine disease has been acknowledged for many years. The two principal views can be placed under these headings:

(*a*) Reflex irritation of the sense nerves, or vasomotor paralysis; and in such cases sexual excess was supposed to play a great part.

(*b*) Metastatic infection. These metastases might be either bacterial or toxic; and it has been held, chiefly by French observers, that slight infections of the uterine cavity might cause metastatic inflammation of the eye.

Many cases have been recorded in which iritis has coincided with the menses. Others have been reported due to suppression of the menses, dysmenorrhea and endometritis. He sums up with the following conclusions:

1. It is most likely that many cases of uveitis, other than those due to syphilis and tuberculosis, are due to infection from a diseased mucous membrane.

2. The most common cause of uveitis is oral sepsis.

3. In the case of gonorrhea and typhoid fever the proof is complete, showing bacterial infection of the eye during the course of these diseases.

4. The findings of cocci, behaving, as regards staining agents, like pneumococci, in a patch of choroiditis makes it almost certain that pneumonia may be a cause of uveitis.

5. In any case of uveitis of which the cause is not obvious, every mucous membrane should be examined by inspection, and, if necessary, bacteriologically; and that if this be done the majority of such cases of uveitis will furnish at least one mucous membrane the seat of infection.

6. Cases of gonorrhea are very difficult to cure when once the deeper parts of the urethra have become infected; that such cases, if not completely cured, may become a source of very serious danger to the patient, not only at a short period after infection by the gonococcus, but even after many years of apparent immunity.

7. The type of uveitis which consists of a solitary patch of exudation into the choroid, with vitreous opacities and keratitis punctata is always secondary to a source of septic infection in some other part of the body, and that source is usually a mucous membrane. (Abstract from *Annals of Ophthalmology.*)

Chronic Prostatitis a Probable Factor in Iritis. As a contribution to the study of focal infections as causes

of ocular disease P. H. Dernehl[6] remarks that the etiology of iritis, following in the wake of a gonorrhea when the iritis is associated with or appears as a direct sequela of a urethritis, is readily established; the more so if signs of a more general systemic gonorrheal infection are in evidence. But when it occurs independently of and in absence of any genito-urinary symptoms or when the interval which has elapsed between the initial gonorrheal infection and the subsequent iritis has been so long, that the relation of the former as a progenitor of the latter is entirely lost sight of the vague and nugatory term of idiopathic or rheumatic iritis is usually applied, particularly as a history of previous "rheumatism" or joint pain can frequently be elicited.

Regarding the clinical entity of such form with its masked etiology opinions are widely disparate. Its actuality as a gonorrheal iritis is denied by some and modern teaching appears to regard such late form as a rare disease.

Fuchs and de Schweinitz in their report at the International Medical Congress, in London, in 1913, upon chronic uveitis, exclusive of luetic, tuberculous and sympathetic forms, express the opinion that the gonococcus plays a very minor rôle in these late chronic forms, but that a rheumatic etiology is very doubtful.

Goldzieher believes that chronic gonorrheal iritis is much commoner than is generally supposed, placing it next to luetic iritis in frequency of occurrence, and that many cases of so-called rheumatic iritis can upon careful study be shown to be gonorrheic in origin, with shreds and organisms in the urine. That we still stand upon the threshhold of our knowledge regarding the etiology of these cases and that increased perfection in our methods of examination will bring forth greater objective evidence and light is certain.

Griffith reports a series of cases of gonorrheal iritis all males in which iritis followed from four to fifteen years after the primary gonorrheal infection. Bacteriologic examinations were not made. He is of the opinion that a great many of the cases of so-called rheumatic iritis are gonorrheal in origin.

(6) Ophthalmology, July, 1915.

Beaumont saw at the Royal Mineral Water Hospital 20 patients from 1888 to 1907, who came there as victims of either gout or rheumatism or rheumatoid arthritis and who suffered from either acute or subacute iritis, two of these were females, eighteen were males, sixteen out of the twenty confessed to having had gonorrhea. Of these one gave a history of having had the infection one year ago, one fifteen years ago, one ten years ago. The remaining cases reported a shorter time. Bacteriologic examinations were not made. He is of the opinion that rheumatic iritis is a very rare disease, and that critical inquiry in many cases will demonstrate a gonorrheal arthritis, and the associated iritis depending for its etiology upon a gonorrheal focus.

Does Pyorrhea Cause Iritis? Referring to the preceding abstract, W. M. Beaumont[7] has more recently investigated the subject of focal infection in the causation of iritis and quotes approvingly Lang's statistics, that 64 per cent. of the cases of iritis attributed to sepsis are caused by pyorrhea alveolaris. He is convinced that this disease is undoubtedly the most frequent cause of this form of iritis, although the patient with pyorrhea may also be a sufferer from syphilis or gonorrhea. However, in a patient suffering from this form of eye disease, careful examination should be made of the mouth and, if it is diseased, appropriate treatment should be instituted. Beaumont says that drastic treatment is warranted in these cases, and, if necessary, all foci of disease should be removed by extraction of the offending teeth. As he puts it: "The cure of iritis is of paramount importance, and it is better to lose thirty-two teeth than one eye."

Now that it has been demonstrated that we have in emetine hydrochloride a real specific for pyorrhea, through the use of which we can not only cure the disease, but usually save the teeth at the same time, it is apparent that this alkaloid should be given a thorough trial whenever the iritis is complicated with Riggs' disease. However, the possibility of syphilitic infection should always be kept in mind.

[Without disparaging the praiseworthy efforts of the internist and surgeon to provide the ophthalmologist with

(7) British Med. Jour., Sept. 26, 1914, p. 525.

a rational etiology for uveal diseases, it yet seems that we are in danger of riding dangerous hobbies. After a time, when the tonsils and teeth have followed all the appendices, what organ will be safe?—Ed.]

Infiltration of the Choroid by Leukocytes in Leukemia. Y. Koyanagi[8] examined anatomically the eyes in four cases of myelogenic and in two of lymphatic leukemia. Three of the myelogenic form showed, aside from retinal hemorrhages, no special changes, but the fourth, and two cases of lymphatic leukemia, exhibited interesting alterations of the eyes, especially of the choroid. In the first case the posterior portion of the choroid, where the vessels are more densely arranged, was much thickened by accumulation of leukocytes, which lay chiefly in the enormously enlarged vessels.

The cases of lymphatic leukemia showed entirely different conditions. Also here the accumulation of lymphocytes in the posterior part of the choroid was very marked, but in the pathologic foci the vessels were either empty or moderately filled with blood, the leukocytes chiefly occupying the axial part. Nowhere was there an ectasia of the vessels visible and the spider-like chromatophores were intermingled with the lymphocytes. Hence there is no doubt that the lymphocytes lie free in the stroma, and that the lymphatic leukemia has a greater inclination to the formation of lymphoma than the myelogenic form.

With regard to the light color of the fundus in leukemia, the second case showed normal, the third a greyish white, coloration. Both presented anatomically almost equal infiltration of the choroid with leukocytes. In myelogenic leukemia which is very seldom associated with infiltration of the choroid with leukocytes, the fundus not infrequently has a light color. Therefore different factors seem to cause the light color of the fundus in leukemia.

Acute Primary Pneumococcus Choroiditis. A rare case of pneumococcus choroiditis is reported by J. G. Clegg.[9] It occurred in a young man 27 years of age. Examination of the fundus after rapid failure of vision

(8) Klin. Monatsbl. f. Augenheilk., 53, p. 153.
(9) Ophthalmoscope, June, 1915.

showed the media clear, but the disc was slightly blurred and the retinal vessels were full. Two whitish areas with fairly well-defined margins were visible, one above and one below the fovea. The upper one was roughly oval, and the vertical long diameter was about one and one-half times that of the optic disc; the lower was crescentic, with the concavity upward, also one and one-half disc diameters in length.

The condition so closely resembled a tuberculous lesion that injection of bovine and human tuberculin were given. The eye became more irritable, the cornea was hazy, anterior chamber deep, pupil wide with large dilated vessels in the iris; vitreous full of opacities, areas of exudation very indistinct, and disc not visible. Panophthalmitis developed and the eye was enucleated.

The pneumococcus alone was found in the specimens. The vitreous and choroid, after being kept in a closed bottle in the cold for six days, during which the cocci would die, were then introduced under the skin of a guinea pig, which was afterwards killed and examined, but no sign of tubercle was found. The other eye remained perfectly healthy.

Fibro-Adenoma of the Ciliary Body. An example of this unusual tumor is described by A. J. Bruecken[1] as a small tumor mass, which was detected microscopically, in the ciliary body of an eye which in the gross showed no evidence of its presence. The eyeball was removed on account of a growth at the inner canthus and involving the eyeball. On microscopic examination no evidence of a nodule was seen in the ciliary body. Microscopically there was found a small tumor, 0.75 mm. in diameter, which the writer considers a fibro-adenoma.

Melanoma of the Choroid. R. F. Moore[2] gives a full histopathologic account of four of these rare neoplasms. He says that the clinical appearances in all four cases were in every essential precisely similar, the differences being only as regards size, shape, position, and density of color of the growths.

---

(1) Archiv. Ophthal., September, 1915, p. 490.
(2) Roy. Lond. Ophthal. Hosp. Reports, Vol. 19, part 3; abstracted from the Annals of Ophthalmology.

In size they varied from about one-half the area of the optic disc to about four times its area.

They were roughly circular or oval in outline. The edges were everywhere quite definite without being quite hard and sharp; there was no shading off into the surrounding fundus, nor was there any light fringe or evidence of pigmentary disturbance at the edge.

They were of quite homogeneous appearance, and the choroidal pattern, though plainly seen around (in two cases), was not seen over the area of the growths.

In color they were exactly that of "blue ointment," differing only in their density.

All were single and close to the optic papilla, the one farthest away being distant about two discs' breadth.

The retinal vessels in their course as they crossed the growths were markedly darker in color than elsewhere; this no doubt was owing to the fact that they were seen against a darker background; the contrast was well seen at the points where they reached the area; in all other respects the vessels were normal in appearance, the overlying retina itself looked quite natural.

In the case of the three smallest growths, although the retinal vessels had an appearance as if riding over a slightly raised area, Moore was unable to be sure of any difference in refraction between them and the vessels of the surrounding retina; in the case of the largest growth, however, a difference of 2 D. was estimated.

The visual acuity was not affected, and there was no scotoma corresponding with the area of the growth in the two cases in which this was examined for.

During the time the patients were under observation (six weeks, five and one-half months, five and one-half months, ten days) there was no change in the appearances.

There was no abnormal pigmentation of the eyes discoverable on external examination.

It would seem that the term melanoma is applied to growths which are most probably of congenital origin, which do not alter in appearance or in size, and are composed of aggregations of deeply pigmented chromatophores.

In a certain number of cases, melanomata, benign

tumors of congenital origin, in whatever part of the globe they lie, may in the course of years acquire malignant characters, and give rise to metastases.

Moore thinks that in the case of a minimal pigmented growth of the choroid, the presence of some or all of the following characters may prove to be evidence of malignancy: A simple non-feathered edge; the presence of stippling or vesicle-like bodies in the overlying retina; irregular pigmentation; any subjective symptoms such as micropsia or possibly a partial scotoma; and evidence of pigmentary disturbance around the edge. If these are present, an accurate outline drawing should be made, using the retinal vessels as lines of latitude and longitude, and increase in size, demonstrated by such means, should lead to enucleation.

Choroidal Angioma. S. Hagen[3] records an instance of this tumor in a seventeen-year-old patient who suffered with a congenital skin angioma covering the greater part of the face, and extending to the buccal mucosa and the conjunctiva. The patient had been practically blind in the right eye since early infancy. The sight of the left eye had always been good until four months before the patient came to the hospital, but for this period the sight of this eye had also been affected, the disturbance of vision being accompanied by pains and by the appearance of colored halos around lights. Ophthalmoscopically there was found at the posterior pole of the right eye a tumor-like protrusion of glistening whitish green color, and the tension of the eye was somewhat raised. The left eye presented an advanced glaucoma simplex. Upon an attempt being made to perform a hypotensive operation on the right eye, an intra-ocular hemorrhage occurred, which made removal of the eye necessary fourteen days later. Microscopic examination showed the growth to be an angioma of the choroid. The patient did not come to the physician on account of the poor vision of the right eye, in which the tumor existed, but because of the rapidly advancing glaucoma in the previously healthy left eye. The tension was higher in the eye in which no tumor was found. It is suggested that the rise

(3) Norsk Mag. f. Laegevid., July, 1915.

of tension in both eyes may have been due to anatomic anomalies of the vascular system.

Pre-retinal Sarcoma of the Choroid. An account of this neoplasm is given by F. Berg,[4] who describes the case of a woman, aged 39, who noticed in January, 1913, a slight transient flickering in her right eye. In September, 1913, vision was greatly reduced. Externally the eye was without irritation; pupil round and reacted sluggishly. Below the optic disc two spherical masses, connected by a bridge, projected into the vitreous. Their color was greyish white. In the whole area there were no retinal vessels; they disappeared at the border of the tumor and reappeared at its peripheral margin. The tumor did not move on movements of the eye. Tension was slightly decreased; vision equaled fingers at 25 cm. eccentrically.

Against the diagnosis of sarcoma of the choroid was the lack of detachment of the retina, so that atypical intra-ocular cysticercus was thought of, especially as there were hemorrhagic opacities in the vitreous. But no eggs of an entozoön could be found in the stool.

The eye was enucleated on Nov. 8, 1913, and fixed in Zenker's solution. It showed a sarcoma of the choroid freely growing into the vitreous, which had perforated a circumscribed area of the otherwise normally situated retina. Such a sarcoma of the choroid is extremely rare. Literature contains only one other case, described by H. Knapp in his work on intra-ocular tumors, 1868.

Intra-ocular Tumor and Radiotherapy. R. Deutschmann[5] recounts his treatment of a melanosarcoma of the choroid in the left eye of a man, aged 51, whose right eye had been enucleated 37 years before on account of an injury. Mesothorium, 0.01, was included in a capsule, and from 1 to 2 hours sewed into a pocket of the conjunctiva at the site of the tumor. After 9 days the growth had become decidedly flattened. The treatment was repeated after a month. Eight months later the condition was the same. The patient now received four treatments at intervals of about two weeks with the result that the former globular projection of the tumor was

(4) Klin. Monatsbl. f. Augenheilk., 53, p. 115.
(5) Zeitschr. f. Augenheilk., 33, p. 206.

replaced by a system of folds with red interstices; its margins were indistinct, but marked by pigment masses. A subretinal effusion was three times drawn by puncture. As the patient wished to return to his home in South America, the treatment was discontinued. Vision was then fingers at 3 m., visual field more contracted. There was no doubt that the tumor was influenced by the rays, but Deutschmann raises the question whether by disintegration of the tumor material an occasion for conveying it into the body may be created and metastasis promoted.

Subconjunctival Injections of Potassium Chloride in Chronic Diseases of the Uvea. The experimental investigations made by A. Bader[6] on the harmless, but stimulating action of subconjunctival injections of neutral potassium salts on the eyes of rabbits suggested the trial of potassium chloride for therapeutic purposes in chronic diseases of the uvea of the human eye. The writer reports his experiences in six cases, with the following conclusions:

Subconjunctival therapeutic injections of from 1 to 2 per cent. solutions of potassium chloride are well tolerated by the eye. They are more painful than the corresponding salt solutions and are advantageously made with an addition of 1 per cent. novocain. Having a more intense action than salt solutions, weaker concentrations and smaller doses suffice for therapeutic stimulation. They favorably influence the diseased tissues of the eye by exerting a local hyperemia, promoting the circulation and thereby bringing about the absorption of intra-ocular inflammatory products, such as opacities of the vitreous, etc. In other words they are a new stimulant, which may be employed as an adjuvant in subconjunctival injections.

Synchisis Scintillans. H. A. Westpfahl[7] examined a marked case of synchisis scintillans in an eye affected with hemorrhagic glaucoma and developing phthisis bulbi, and found microscopically and chemically that the crystals consisted of pure cholesterin. From statistics of the clinic on 65,000 patients within the last nine years, synchisis scintillans occurred in 40, *i. e.*, 0.66 per 1,000. In 90 per cent. the affection was unilateral, and was

(6) Zeitschr. f. Augenheilk., 33, p. 155.
(7) Archiv. f. Augenheilk., 78, p. 1.

observed at an average of 61 years. It was always associated with other senile changes, so that it may be considered as a phenomenon of degeneration.

Its occurrence at an earlier age depends on marked degenerations of the whole eyeball, *i. e.*, post-traumatic detachment of the retina, phthisis bulbi, etc. In 47 per cent. the eyes, especially the fundus, and vision, were normal. In 25 per cent. it was combined with senile cataract, which, at an average age of 70, apparently was accidental. In 28 per cent. it was complicated by intraocular diseases, but these could only in the minority of instances be regarded as causes of the formation of cholesterin, while in the majority an accidental coincidence must be assumed.

THE LACHRYMAL APPARATUS.

Suture of the Lachrymal Canaliculi. A method of *reuniting severed lachrymal canaliculus* is described by Elschnig.[1] After stopping the hemorrhage, if possible by adrenalin, a thin caoutchouc probe, about No. 1 Bowman, is introduced into the tear-point and the peripheral end carried 10 mm. out of the wound. The nasal part of the lid is grasped on the epidermal and conjunctival sides with two forceps and stretched, so that the nasal portion of the canaliculus is exposed. A silk thread is then introduced through the conjunctiva from close to the posterior wall of the lateral end to a corresponding point of the conjunctiva behind the nasal end. A similar suture is passed through the skin at the anterior walls of both canalicular ends, but not tied. The probe introduced into the lateral end is now inserted into the nasal portion to the tear-sac, and both sutures are tied. The remaining wound of the lid is united by sutures, and the probe is cut off, so that 2 cm. project from the tear-point. A piece of gauze smeared with vaseline is placed in the inner angle of the lids behind the probe, and a binocular bandage is applied, which remains for from two to three days. The sutures are removed on the sixth, and the probe on the seventh day. Elschnig states that

(1) Klin. Monatsbl. f. Augenheilk., 55, p. 144.

he performed this operation in five cases with perfect success.

Lachrymal Concretions. A rare and interesting example of this deposit is reported by G. Maxted.[2] A female, aged 68, complained of pain and discharge in the left eye. For the last three or four years she had been troubled with "watering" in the left eye, the fluid remaining quite clear until the last two or three months, when it became purulent and was associated with a good deal of pain and smarting in the corner of the eye; recently this pain had been so severe as to disturb her sleep at night.

On first seeing the patient one thought that she had a "sty" at the inner end of the lower lid, as it was much thickened and inflamed in this situation, but on looking more closely it was seen that the punctum was standing out at the summit of the inflammatory mass, as shown by a bead of pus exuding from it; the caruncle and neighboring part of the conjunctiva were much congested, and on everting the lower lid the region of the canaliculus was seen to be greatly enlarged and swollen toward the conjunctival surface. A probe was passed through the canaliculus without the presence of any concretion being detected. The region of the upper canaliculus showed changes precisely similar to those of the lower.

The lachrymal sac itself was not dilated, and on syringing through the lower canaliculus only a small quantity of muco-purulent fluid escaped through the upper; no fluid appeared to pass down the nasal duct.

The lower canaliculus was then slit up, and at once six small faceted fawn-colored concretions escaped; they were not very hard, and could be indented with a probe. On slitting up the upper canaliculus three somewhat larger concretions escaped, also faceted, and of the same consistency and color as the others. The largest concretion measured 4 mm. across and the smallest 2 mm. Both canaliculi were greatly dilated, and their mucous lining was replaced by granulation tissue; nevertheless, they were still patent into the lachrymal sac, as shown by the course of the fluid on syringing. When a probe was passed into the lachrymal sac through the partially slit-up

(2) British Med. Jour., May 15, 1915.

canaliculi, it was evident that they were constricted just at their entrance into the sac.

The literature on this subject shows that the upper canaliculus is rarely affected by concretions, although it was so in this case. Accompanying dacryocystitis is unusual, and in this patient the epiphora of several years' duration can well be explained by the obstruction in the canaliculi rather than by any nasal duct obstruction; this is borne out by the subsequent course of events, as two months after the removal of the concretions the woman had no epiphora and no accumulation of fluid in the lachrymal sac; the canaliculi had remained patent, and all thickening and congestion around them had disappeared.

Bacteriologic examination of the concretions after decalcification showed them to be made up of a mass of organisms somewhat resembling colonies of actinomyces—long, thin organisms of the streptothrix class, staining very imperfectly by Gram's or methylene blue stains, and showing in places false branching.

The bacteriology of this affection is as yet rather obscure and in want of accurate classification, but most observers agree that the concretions are due to a fungus which is a form of streptothrix difficult of cultivation.

Argyrosis of the Lachrymal Sac. E. von Skramlik[3] reports the case of a woman, aged 59, who instilled a 1 per cent. solution of argentum colloidale into the right eye for seven months; in the first three weeks daily, and then occasionally. There was a marginal, torpid ulcer of the cornea, intense greyish violet discoloration of the whole conjunctiva, and blennorrhea of the lachrymal sac. A probe could not be introduced into the duct. The tear-sac was extirpated, fixed in celloidin, hardened in alcohol, cut in series and stained. The microscopic examination showed the typical picture of chronic dacryocystitis and changes caused by the deposit of silver. These were of two kinds: a diffuse light brown coloration of the subepithelial fibers of connective tissue and numerous grey or black more or less fine granules, almost exclusively intracellular or on the elastic fibers in the subepithelial and deeper portions of the wall. Both

(3) Klin. Monatsbl. f. Augenheilk., 54, p. 443.

were dissolved by a 5 per cent. solution of cyanide of potash, which proved that the diffuse impregnation and the granules in the cells were combinations of, or amorphous, silver. It is a well-known fact that the local application of the more recent silver salts, especially protargol and argyrol, soon lead to argyrosis. This is readily conceivable as the easier a silver preparation penetrates into the mucous membrane, the sooner silver is deposited in the tissue. Thus the greatest number of recently published cases of argyrosis was brought about by argyrol. The histologic changes seem to be identical in all silver preparations. Apparently a certain final product (metallic silver) is deposited in the tissue. The case showed again that no silver preparation ought to be instilled into the conjunctival sac for any length of time without constant control.

Orbital Phlegmon with Atrophy and Pigmentation of the Optic Nerve After Dacryocystitis. F. Rossler[4] describes the right eye of a woman, aged 48, who had suffered for 30 years from epiphora and for a year from purulent dacryocystitis. The eye became suddenly swollen and painful, and was blind on the second day. Rossler found intense swelling of the lids and the region of the lachrymal sac. The eye was much injected, immovable; exophthalmos, iridoplegia. The vitreous showed fine opacities, the retina was whitish-opaque; disc ill-defined; veins very ectatic; arteries tortuous and narrow. No hemorrhages and no red spot at the macula. V.=0. Several incisions emptied a large quantity of pus. After five months the disc was white, the opacity of the retina diminished, veins of almost normal width, arteries very narrow, the lower temporal third of the optic disc covered with fine granular greyish-black pigment, interspaced by white stripes. The tear-sac was extirpated. As the lachrymal fossa was lacking, the conditions were favorable, through an enlargement of the sac toward the orbit, for a propagation of the suppuration into the orbit. The sudden blindness and the ophthalmoscopic changes made it probable that it was caused by a violent compression of the optic nerve and its vessels and propagation of the inflammation through thrombo-phlebitis. Not only

(4) Klin. Monatsbl. f. Augenheilk., 53, p. 383.

the vein but the central artery also was obstructed. Rossler assumes that as part of the damage to the optic nerve (in consequence of the inflammation) small hemorrhages occurred either by diapedesis or by rupture of the vessels, and that the blood was not absorbed owing to defective circulation, but deposited as pigment.

[The Editor recently saw in consultation a similar case, in which the erysipelatous (streptococci) invasion had, among other severe consequences, produced necrotic periosteal areas on the frontal bone and the bony walls of the orbit.]

Lachrymal Adenitis. An example of this infection is described by E. Jeffrey.[5] A schoolboy, aged 7 years, complained of pain and swelling in his left eye. The symptoms had been present for a week.

On examination, the upper lid was seen to be in a state of ptosis and to be slightly cyanosed in its outer half. On palpation, a structure of moderately tense consistency, with well-defined edges extending down and covering the upper and outer quadrant of the cornea was felt. This swelling was slightly tender, but not extremely so. The mass was confined to the outer half of the upper lid, and seemed to be prolapsed from under the supra-orbital ridge, as no superior edge could be felt. The conjunctiva was somewhat injected, but in all other respects the eye was normal. The vision was not impaired when the lid was raised from the cornea. When the lid was everted, it was seen quite plainly that the ptosis was due to the mass pushing the upper lid downward in the region of the outer half of the superior fornix of the conjunctiva.

A provisional diagnosis of lachrymal adenitis was made. Next day he returned with pus beneath the upper lid; but a careful examination failed to reveal any evidence of suppuration. Treatment with fomentations and argyrol was instituted. The improvement was rapid. The mass, which proved to be an inflamed process of the lachrymal gland, receded within a few days beneath the supra-orbital ridge, and was soon no longer palpable. There were no marked constitutional signs at any period of the affection, and no evidence of other glandular involvement was obtained.

(5) Med. Jour. Australia, Aug. 7, 1915.

RETINA AND OPTIC NERVE.

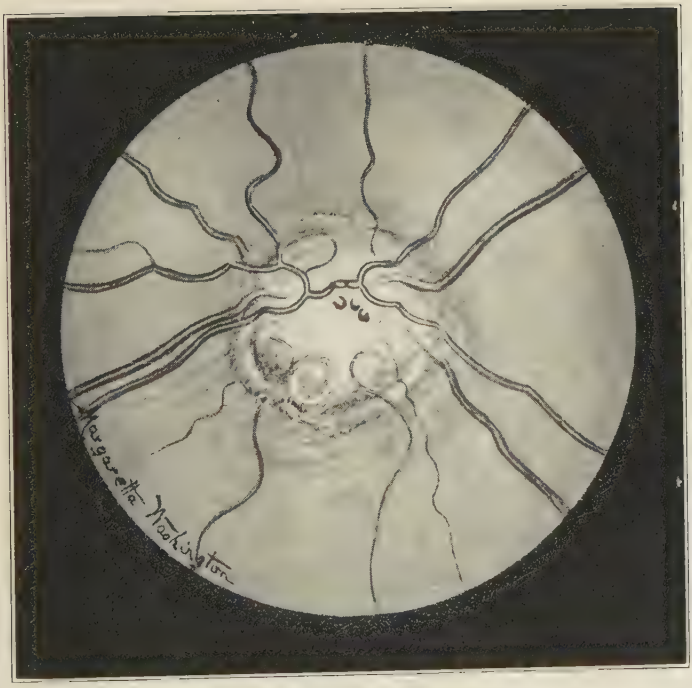
Congenital Absence of the Arteria Centralis Retinae. This congenital anomaly, associated with embryonic remnants about the macula, is reported by R. I. Lloyd[1] in the eye of a man who had divergent squint of nine years duration. There were no central vessels in the nerve head. There was, however, the usual vascular arrangement in the fundus and some large ciliary vessels. There were, also, pigment changes on the macular side of the disc and a large plaque of glistening white material which occupied the whole macular region.

Hole in the Disc Associated with Vibration of an Overlying Membrane. The condition known as crater-like hole in the disc is of infrequent occurrence, as is shown by the fact that Reis encountered but five cases among 55,000 cases seen at the Bonn clinic during a period of ten years. T. B. Holloway[2] describes an interesting example of this anomaly:

H. A. S., aged 19, consulted him on account of vague asthenopic symptoms and squamous blepharitis. Aside from a slight inequality in pupils, no changes were noted except the condition about to be described. The left disc was slightly oval, with the long axis slightly oblique. There was a narrow crescent out. Situated in the lower outer quadrant of the disc was an egg-shaped pigmented area with its long axis corresponding to the long axis of the disc. A portion of the nerve between the exit of the vessels, which was slightly eccentric up and in, was distinctly pale and appeared as though there were a shallow groove extending down and out, the peripheral portion of which was occupied by this pigmented area. The periphery of the lesion corresponded to the margin of the disc and in size it was about one-third the diameter of the papilla. Just within the margin of the pigmented area there was a delicate white oval. The lesion was greenish-black in color, appearing as though the tissues had been saturated with a soluble stain rather than being the seat of the ordinary pigment deposit. It conveyed the impression of an excavation, as one could dis-

(1) Jour. Ophthal., Otol. and Laryngol., August, 1915.
(2) Ophthal. Rec., May, 1915, p. 250.

PLATE II.



Hole in the disc with overlying, vibrating membrane.—Holloway (see page 96).

tinguish a sloping of the margins to the position of the white rim. In attempting to determine the depth of the supposed excavation, careful examination detected a pulsation of a small milky area, doubtless a reflex, situated somewhat eccentrically up and in from the center of the lesion. The direction of the pulsation was in the long axis of the hole. It was noted that a gray veil covered the supposed excavation and extended to the white linear oval (Plate II.).

Pigmented Retinitis Punctata Albescens. Martha Diem[3] reports this disease in a girl aged 18, whose father and father's brother had retinitis pigmentosa, whose grandmother had been blind and other members of the family had ocular affections. The patient presented diminished central vision and peripheral contraction of the visual fields. The macula was encircled by fine, yellowish-white spots. The periphery of the fundus also showed yellowish-white spots and accumulations of black pigment. Thus the case presented the rare combination of two different pathologic processes: retinitis punctata albescens and retinitis pigmentosa—a chronic atrophy of the retina, in which the degeneration set in at different parts of the retina in varying intensity.

Primary Tuberculosis of the Retina. In the literature of the subject only three cases of primary tuberculosis of the retina and five cases of tuberculosis of the optic nerve were found by K. Otori.[4] In none of these were tubercle bacilli demonstrated; the diagnosis being made from biologic and histologic findings.

The writer reports the clinical histories and anatomic examinations of the eyes in two cases of his own observation, in which for the first time tubercle bacilli were found in the retina, after staining the sections according to a modified method of his own. The retina was much changed and showed a few tubercles of characteristic structure, with typical giant-cells of Langhans. Between the tubercles epithelioid cells were found, while the vessels, especially the veins, were infiltrated with round cells. The tubercle bacilli were found only in the retinal tissue and in places where it was relatively little changed,

(3) Klin. Monatsbl. f. Augenheilk., 53, p. 371.
(4) Archiv. f. Augenheilk., 79, p. 44.

viz., at the equator. They were very numerous in the perivascular infiltrations of the periphery, whereas there were none in the uveal tract. As Gilbert has pointed out, these facts throw light on another retinal affection in tuberculous individuals, *viz.*, the periphlebitis retinalis adolescentium. Especially it proves that perivascular round-cell infiltrations of the retinal veins, frequently observed in the most different acute and chronic intraocular inflammations, are not only secondary—a phenomenon of irritation—but that the transport of the tubercle bacilli in the venous sheaths itself elicits inflammation and thus accounts for the foci of round cells.

Otori concludes that the rare occurrence of primary retinal tuberculosis depends not alone on the scanty supply of blood and the greater velocity of the blood current in the retina, but also on a certain indisposition of the retina for primary tuberculosis. He believes that the primary process in his cases consisted in perivasculitis of the retinal veins, and this was not a reaction phenomenon of the toxic irritation, but was directly caused by the tubercle bacilli, carried from the infectious source in the thorax by the lymphatics into the retina.

The Retinitis of Pregnancy. An interesting paper on this subject is by J. Herbert Fisher.[5] The writer does not include in the title the term "albuminuric," as he wishes to lead away from the idea that the acute retinal changes are the results of the kidney disorder. Obstetricians now no longer explain the albuminuria of pregnancy as the result of obscure reflex effects of the gravid uterus on the kidneys, or by mechanical pressure on the ureters. They attribute it, with the eclampsia and pathologic vomiting of pregnancy, to toxemic products in the circulation. Eclampsia could not be predicated by any examination of the urine; the effects were especially seen in the quality of the blood and in the blood-vessel walls. In fatal cases of eclampsia, brain hemorrhages and necrotic changes in the liver were often found, and albuminuria was an effect of the disease on the kidney, not the cause. In the retinitis of pregnancy, the condition of the retina is different from that of albuminuric retinitis; as also is its sequal. Syncytio-toxins—prod-

(5) Trans. Ophthal. Sec. Roy. Soc. Med., June, 1915.

ucts of the disintegration of the syncytium cells—had been found in these cases, and these cells immediately connected the fetal with the maternal structures. In one fatal case under his care A. C. Hudson made a pathologic examination on the day after death, and found the coats of the eye *in situ*. There was some edema of the nerve head, and in the nasal quadrant of the retina were two large hemorrhages. The microscope showed the sclera and nerve sheaths to be normal, the chief pathologic changes being in the large choroidal arteries, many of which showed gross endarteritis, causing, in some instances, obliteration of the vessel lumen. Some of the choroidal arteries were normal. Similar pathologic changes were found in sections of the posterior ciliary arteries surrounding the optic nerve behind the eyeball. Bruch's membrane was everywhere intact, and the retinal pigment normal. The retina and optic nerve head showed evidence of edema, in the former almost limited to the internuclear layer. Rods and cones were almost entirely absent, but this might be attributed to post-mortem changes. In the large retinal veins there was pronounced thickening of the adventitial coat.

Fisher has found it difficult to group his cases. The rule has been for good recovery of vision to ensue, with the disappearance of all acute manifestations in the retina, thus differing absolutely from cases of ordinary renal retinitis. Permanent defects of vision are probably due to changes in the walls of the arteries, or to an atrophic condition of the nerve. A recurrence of the retinitis is not necessarily seen when pregnancies subsequently occur, even though the albumin does not quite disappear in all. One of his patents died after an interval of six years, from cardiac failure; another after eight and one-half years, of cerebral hemorrhage into the left corpus striatum. In this case the kidneys were found to be of the typical red granular type. It seems clear, from his cases, that the albuminuria of pregnancy is not sufficient alone to set up the typical retinitis of pregnancy.

Retinitis Pigmentosa Treated by Trephining. Believing that any device or treatment that improves the retinal circulation will benefit vision, and bearing in

mind the effect of the administration of amyl nitrite, subconjunctival injection and paracentesis of the anterior chamber M. S. Mayou[6] essayed the use of the trephine in retinitis pigmentosa. Doyne had shown that extraction of the lens was followed by immense improvement in vision, due, it was considered, to the fact that the patient is always in a condition of semi-daylight owing to the cataract, so that the retina did not receive sufficient stimulation. Mayou, while not denying this, thought that the lowering of the intra-ocular tension, with the consequent flushing of the retinal vessels, and the filtration of fluid through the scar, might be an additional factor, possibly the most important one, in the good result. He thought trephining would result in the retinal vessels being flushed with blood, and that the subsequent leakage might lead to a more rapid excretion of fluid from the eye, and drain away any toxic products which might be causing local vascular sclerosis.

He gives the history of a patient upon whom he did this operation and in whom there was much improvement in vision, lasting four and one-half months. The patient, Jewish, age 17, had complained of night-blindness for two years; various relatives were similarly affected; there was marked pigmentation of the periphery, discs slightly gray, vessels practically normal in size; the fields were contracted to a 10° circle on both sides. Paracentesis resulted in distinct improvement in the fields. Trephining of the sclera of one side caused a reversion of the field to normal within a week and the patient could walk about freely in a darkened room; improvement continued to date (four and one-half months). On covering the unoperated eye she could see well at night; but if both eyes were open she was still somewhat night-blind; he could not advance any explanation of this. The improvement could not be expected to last very long; but it might continue for a length of time which justifies the operation, he thinks, in selected cases.

Detachment of the Retina. R. R. James[7] reports a case of probable spontaneous cure of retinal detachment

(6) Medical Press, May 5, 1915.
(7) Ophthal. Rec., January, 1915.

in a male, age 44, who eighteen years previously had an injury to his left eye. Three days before admission to hospital he had a severe coughing spell, and two days later could not see properly with his right eye. Pupil reacted to light. Tension was normal. A large detachment was present in the lower part of the eye, the field being diminished upwards. There were a few coarse vitreous opacities; no hole in the detached retina. Vision was 6/60 with —13.0 sph. The left eye was divergent, absolutely blind, with a yellow chalky looking opaque lens and some recent hemorrhage in the anterior chamber. The tension was slightly increased.

The patient was put to rest flat in bed, his head steadied between sandbags, a cough mixture prescribed, and, after the first week, was ordered subconjunctival injections of normal saline solution twice weekly.

A year and eight months later his vision was 6/12, the field showed only a slight contraction downwards, due to a patch of choroiditis in the upper part of the fundus.

The writer emphasizes the point that detached retinae do occasionally re-attach themselves; and that the treatment for detachment by puncture or cautery rarely leaves an eye with a good visual result.

He does not think the subconjunctival injections were of any material service.

An additional example of spontaneous re-attachment of the retina, after a lapse of twenty-two years, is reported by A. Edward Davis.[8] The patient, aged 18, was first seen Aug. 12, 1897, with the history of a fall from a carriage when six years of age, striking the left side of the head. The writer is of the opinion that a choroiditis of a tuberculous nature developed subsequent to the traumatic detachment, and that with the improvement of the patient's health when in the country, the choroiditis subsided and in the healing process the retina was again bound to the choroid. Davis is inclined to favor non-surgical treatment in these cases.

Surgical Treatment of Retinal Detachment. A good deal of attention has been given during the past year to the operative treatment of detached retina.

(8) Ophthal. Rec., October, 1915.

T. H. Curtin[9] reports a case in which a scleral button, 2 mm. in diameter, was removed from under a conjunctival flap over the site of the detachment and as far back as possible, between the inferior and external rectus muscles, by a trephine. The choroid and retina were not punctured; and the conjunctival edges were united by two sutures of silk and a moderate pressure bandage applied. The patient was returned to bed and atropine drops were instilled. A medium-sized aspirating syringe was then pushed through the conjunctiva and the trephine opening and 25 minims of clear, white fluid were aspirated. This was subsequently found to resemble serous fluids in general. The fundus of the eye was immediately examined and the retina was seen to have fallen back into place.

F. B. Tiffany[1] uses for detached retina the ordinary small Elliot trephine. As soon as he has cut through the sclera and removed the button, the choroid presents itself. He then grasps the protruding knuckle and with a curved, flat scissors clips it away. A slight amount of the accumulated serous fluid, with vitreous, escapes and the retina is forced into the opening of the choroid, coming into contact with both choroid and sclera. At this point it forms firm and permanent adhesion. Tiffany reports one such patient successfully operated on by him.

J. Ohm[2] is also an advocate of scleral trephining in detached retina and cites the history of a man, aged 42, whose congenital nystagmus had been aggravated by miner's nystagmus, and who showed a flat detachment of the nasal portion of the left retina with a large horseshoe-shaped rupture, covered with hemorrhages. V. with —5.00=fingers at 4 mm. After keeping quiet for five weeks the detachment was found to be also downward and outward. Six weeks later it occupied the whole lower half of the retina and showed grayish-white folds. V=fingers at 3 m. A bridle suture was made through the conjunctiva near the lower limbus, in order to be able to roll the eye well upward.

---

(9) Ophthal. Rec., February, 1915.
(1) Ophthal. Rec., March, 1915.
(2) Zeitschr. f. Augenheilk., 33, p. 288.

A triangular conjunctival flap was turned downward and outward; trephining of the sclera with Elliot's trepan downward and outward, about 9 mm. from the limbus, with evacuation of considerable subretinal fluid; suture of the conjunctiva; pressure bandage; rest in bed for a few days completed the treatment. The first ophthalmoscopic examination after four days showed complete re-attachment of the retina. After three weeks V with correction= 4/30; after five months 4/18; visual field normal.

Ohm thinks that trephining evacuates the subretinal fluid more thoroughly and permanently than simple puncture with von Graefe's knife; it also avoids injury of the retina. He believes that in future one will decide upon early operation, as aside from the advantage of the detachment downward the situation is deteriorated by postponement.

S. Holth[3] is a firm believer in the efficacy of pre-equatorial sclerectomy in most cases of retinal detachment. He has not seen a single case of spontaneous cure of primary retinal detachment in the course of twenty-four years. In the past two years he has told every patient with rents in a retinal detachment that he had never seen a single recovery in such cases. In Holth's opinion, if pre-equatorial sclerectomy is reserved for the detachments in which, after repeated painstaking ophthalmoscopy under atropine mydriasis, no rent can be discovered even at the utmost periphery of the fundus, more cures will be achieved by this method than with any other treatment which he knows. It may be argued that such cases offer a relatively good prognosis with non-operative or other forms of operative treatment. But pre-equatorial sclerectomy has a great advantage as compared with most methods of treatment, in that when it does produce complete cure this is apt to come suddenly, which is of the greatest significance as regards the best possible re-establishment of the retinal function.

Ingolf Schiötz[4] furnishes additional evidence in favor of pre-equatorial sclerectomy in this disease. He

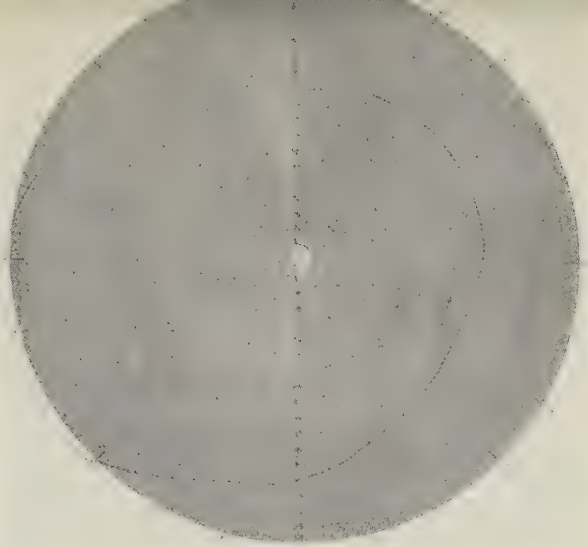
(3) Norsk Mag. f. Laegevid., June, 1915.
(4) Norsk Mag. f. Laegevid., April, 1915.

says that since 1911 every case of retinal detachment in Hjalfdan Schiötz's clinic has been treated by Holth's method of pre-equatorial sclerectomy. The present report covers the first nineteen of these cases and two of Hjalfdan Schiötz's private cases. After making a conjunctival flap outward and downward, a meridional cut is made in the sclera with a modified Graefe knife. As the choroid is approached, a suitable opening is cut in the sclera with Holth trephine scissors. Sometimes the choroid was intentionally cut, sometimes not, and sometimes the subretinal bleb opened itself spontaneously. Sometimes instead of trephine scissors a two and one-half millimeter Bowman's trephine was used. In no case was a postoperative reaction observed. Dressings or compressive bandages were never used, the eye being merely covered with an aluminum shield. Five of the twenty-one patients showed improvements, nine remained in the *status quo ante*, and six were worse, at the time of discharge from the hospital. At later examination three showed improvement, five maintained the *status quo ante*, and eleven were worse. The results under this treatment were not strikingly better than after other operations, but they were by no means worse; and as no better treatment is available, Hjalfdan Schiötz has continued to employ pre-equatorial sclerectomy, usually combined with the horizontal position both before and after operation.

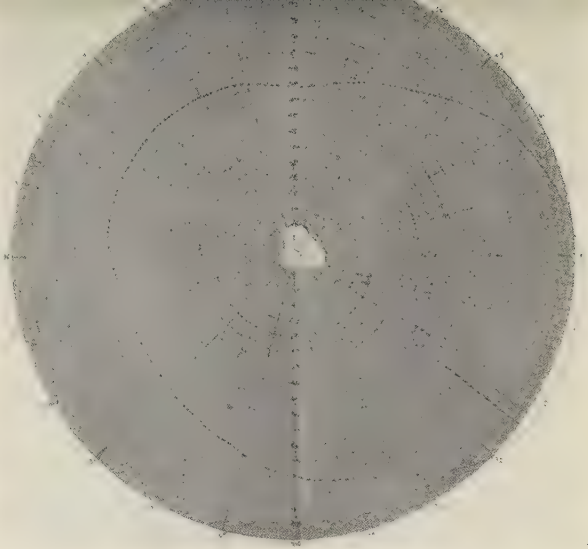
Congenital Division of the Optic Nerve at the Base of the Skull. This rare and curious anomaly is described by C. M. Snead.[5] He reports that the right optic nerve divides in front of the chiasm, at a distance of about 6 mm., into two parts, of which the one situated on the temporal side measures about 2.5 mm. while the nasal one measures 4 mm. As these two parts approach the eyeball they again unite to form a round strand which seems to be perfectly normal. The writer refers to three other cases reported in literature.

Rupture of the Central Artery in the Stem of the Optic Nerve in Bright's Disease. C. Velhagen[6] gives

(5) Archiv. Ophthal., July, 1915.
(6) Klin. Monatsbl. f. Augenheilk., 54, p. 676.



Left field of vision.



Right field of vision.

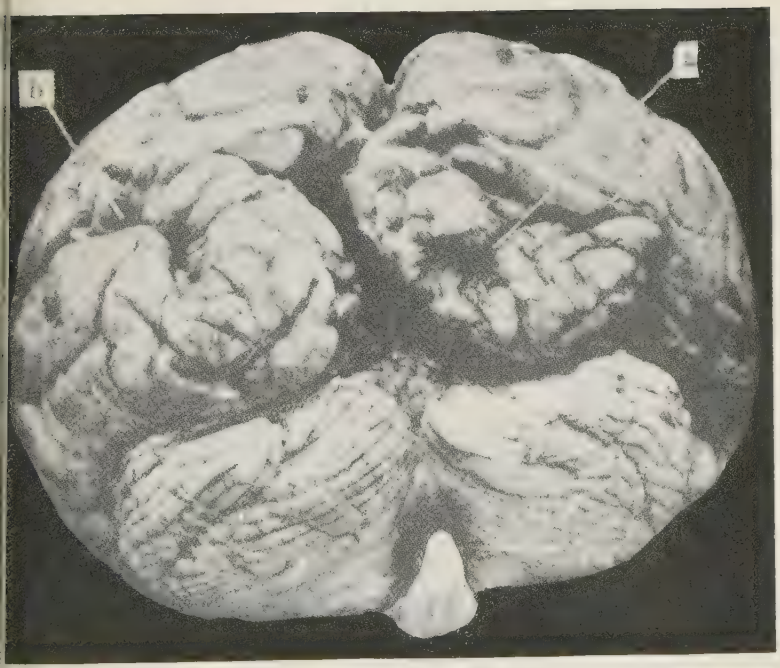
Perimeter charts in the case of M. M'G., taken by Dr. Sinclair on 10th April, 1905.

The dark interrupted line encloses the area over which the field of vision normally extends. The part of the dark shading within the dotted line shows the extent to which blindness had encroached on the field, and the area at the center, which is very lightly shaded, indicates the remaining field.

The remaining field responded to a white test object 10 mm. in diameter and seen at 250 mm. distance (as taken with the perimeter).

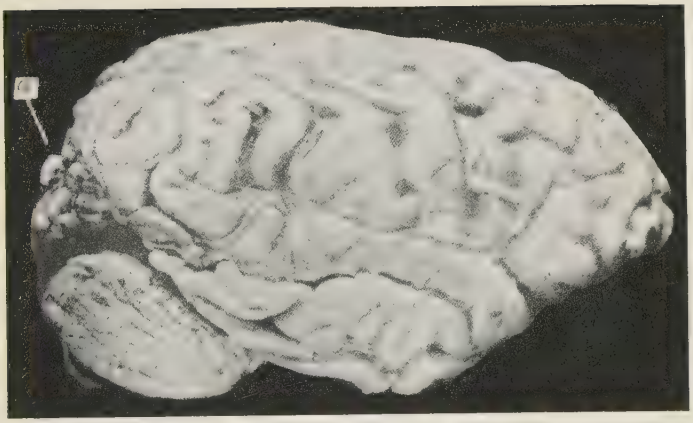
The small white areas within the remaining field on the right side of the fixation point responded to a smaller stimulus, i. e., a white test object 10 mm. in diameter and seen at 2000 mm. distance on Bjerrum's screen.—Bramwell (see page 108).

PLATE IV.

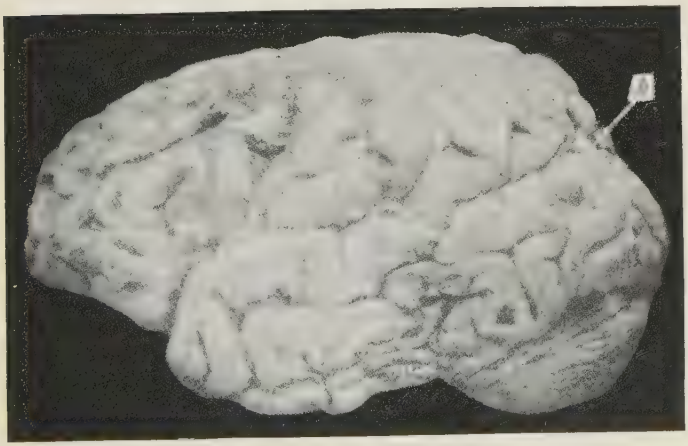


Brain in the case of M. M'G., showing the appearance of the occipital lobes as seen from behind.

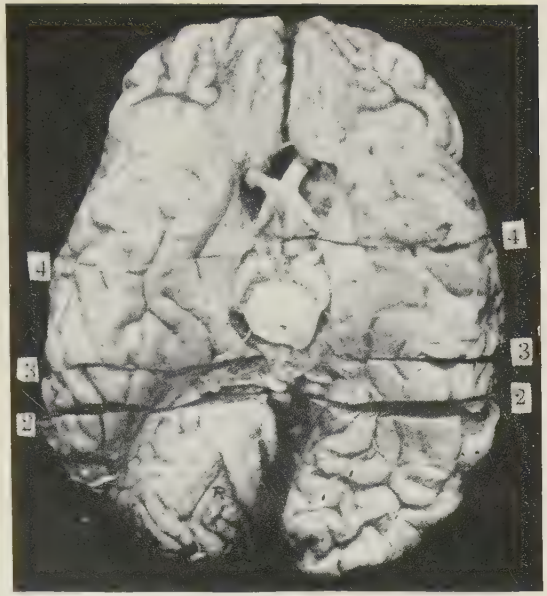
The letter *a* points to the lesion in the right, and the letter *b* to the lesion in the left occipital lobe.—Bramwell (see page 108).



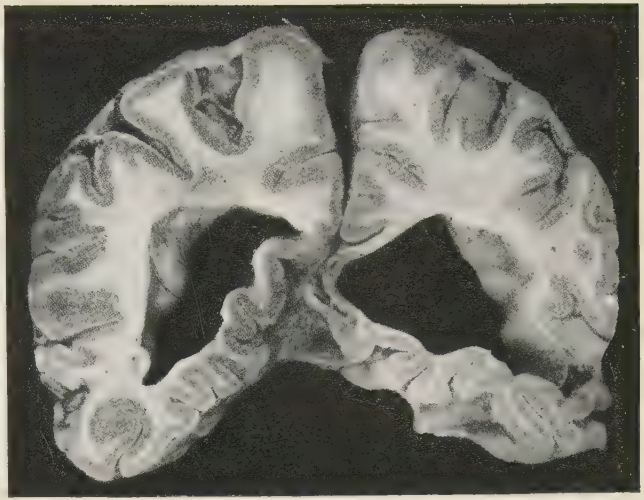
Lateral view of the right side of the brain in the case of M. M'G., showing the appearance of the occipital lobe to which the letter *a* points.—Bramwell.



Lateral view of the left side of the brain in the case of M. M'G., showing the appearance of the occipital lobe to which the letter *b* points.—Bramwell (see page 108).



Base of the brain in the case of M. M'G., the cerebellum detached, showing the position of the transverse vertical sections—2, 2; 3, 3; and 4, 4.—Bramwell.



Transverse vertical section of the brain in the case of M. M'G., showing great secondary (compensatory) dilatation of the ventricles.—Bramwell (see page 108).

the clinical history of a woman, aged 26, who suddenly became blind in her right eye, presenting the typical aspect of embolism of the central artery. Death occurred after five weeks from Bright's disease. The autopsy and microscopic examination of the eye revealed as the cause of the sudden closure of the central retinal artery a rupture of its wall and a hematoma which had compressed the lumen of the vessel to such an extent that the picture of embolism of the central artery resulted. The thrombus of the central vein was secondary and must be considered due to vascular stasis. The hemorrhage was attributed to the chronic hemorrhagic nephritis. This theory was rendered more probable by the inflammatory changes of the central retinal artery within the lamina cribrosa and its retinal branches, such as are often found in albuminuric retinitis.

Opaque Nerve Fibers in and Pigmentation of the Disc. Olga Pálich-Szánto[7] describes the optic disc of the right eye of a soldier, who never could see well with this eye. The disc was larger than normal, projected 2 D., and had a bright yellow color. The vessels were normal. The prominence was caused by a proliferation of tissue of decidedly fibrous structure. The left disc showed similar changes, but not so marked. The writer explains the condition by an abnormal longitudinal growth of medullated nerve fibers in front of the vascular funnel and covering the vessels of the disc.

Another patient, also a soldier (aged 26) with normal vision, showed in his left eye a pigmentation of the nasal half of the optic disc. The pigment consisted of fine granules that lay chiefly on the surface, but were also noticeable in the deeper portions.

After discussing the different explanations of pigmentation of the disc, the writer considers the following three as the most probable:

1. Embryonic scattering of germs producing an isolated group of pigmented cells at places where they do not occur normally.

2. From embryologic investigations Pick found that

(7) Klin. Monatsbl. f. Augenheilk., 55, p. 149.

in the human embryo at the seventh week, or perhaps earlier, marked tracts of pigment pass from the pigment layer of the eye into the optic stalk. Hence it may be possible that these pigment tracts occasionally persist and cause pigmentation of the disc.

3. According to Berger, the inner strata of the lamina cribrosa originate from the choroid, and their peripheral portions always contain pigment cells. Berger ascribes the pigmentation of the disc to the abnormal hypertrophy of these cells.

Pseudo-Optic Neuritis. A case that somewhat resembles Beard's classic instance is reported by Phinizy Calhoun.[8] It occurred in a woman, aged 43. The margins of the disc were blurred and obliterated by a slight swelling. The vessels were normal in size and position except that the temporal veins of the right eye were slightly full, and as the vessels approached the disc they were lost or covered in the slight swelling and striations of retinal tissue.

Acute Retrobulbar Neuritis Localized in the Chiasm. Seven instances of this condition are reported by H. Rönne[9]. The origin of the disease, the subjective symptoms, and the course are essentially identical with the severe forms of retrobulbar neuritis. The visual field is characterized most frequently by simultaneous hemianopic (often temporal hemianopic) defects and central scotomas. The defects often show a peculiar migratory type, which is not found in any other form of the disease. The affection frequently accompanies myelitis and multiple sclerosis, and is a retrobulbar neuritis, without regard to any form of optic neuritis or choked disc that may accompany it. The edema of the disc is secondary, and localized in the stem of the optic nerve and especially in the chiasm, and influences the visual field and the course of the disease. Corresponding retrobulbar neuritis with predominant localization in the chiasm is also found without concomitant spinal affections.

Psammoma of the Chiasm. An example of this rare neoplasm was found and described by P. Heinrichs-

(8) Ophthal. Rec., May, 1915.
(9) Klin. Monatsbl. f. Augenheilk., 55, p. 68.

dorff.[1] The patient, a woman, had died from general arteriosclerosis and granular atrophy of the kidneys. A greyish-red, nodular tumor of the size of a cherry was discovered at the anterior angle of, and below, the chiasm, but without connection with it. The left optic nerve was lifted in the form of an arch around the tumor by which it had been flattened. The tumor lay immediately before the infundibulum, from which it could be easily detached, although it extended into the sella turcica and possibly exerted pressure on the hypophysis. These relations to the adjacent parts are easily conceivable from the origin of the psammomas, *i. e.* from the endothelia of the lymphatic spaces of the dura mater. A similar small tumor was discovered in this case on the dura mater of the inner surface of the frontal bone. The tumor showed all the characteristics of psammoma: collections and bands of short spindle cells; within these hyaloid cells and globules of lime. Clinically, there were no visual disturbances. If the tumor had grown one would have expected bitemporal hemianopsia and atrophy of the optic nerves, especially on the left.

Effect on the Eye of Tuberculosis of the Hypophysis. A description of this infection is given by N. J. Heybroek,[2] as it occured in a 7-year-old girl. She complained of poor vision which came on suddenly and appeared to be progressive, after having shown during a year increasing symptoms of diabetes insipidus.

Diagnosis: in both eyes neuritis retrobulbaris; no bitemporal hemianopsia; no choked disc. Urine, daily quantity about 4 liters, with Sp. gr. 1001—1004; no sugar even with abundant carbohydrate feeding. Von Pirquet test negative, but after one week undoubtedly positive. A month later a sleepiness set in, with much yawning and decrease of the urine quantity and increase of the specific gravity. The vision diminished so that in four or five months complete blindness was present. Then the patient had to be awakened for meals; chewing was very imperfect; the mouth often remained open during this time. The memory did not seem to have suf-

(1) Klin. Monatsbl. f. Augenheilk., 53, p. 185.
(2) Tydschr. v. Geneesk., July, 1915.

fered during the few clear moments. The pulse rose from 84 to 104, while the blood-pressure sank from 106 to 80 mm. Hg. During this period of drowsiness an adipose layer formed around the trunk. Five months after the beginning of the visual disturbance, about a year and a half after the beginning of the diabetes insipidus, the child succumbed with the usual signs of tuberculous meningitis.

A Roentgen photograph showed a shadow in the cavity of the (not enlarged) sella turcica. As operative interference was excluded radium, later tuberculin, was tried. After the third tuberculin injection vomiting appeared with a temperature of 40° R., and great prostration. On the following day there was a critical decrease of the temperature with an amelioration in the general condition; no sleepiness. Patient ate and drank with gusto. Afterward she grew worse. The writer thinks that the position of the gland with respect to the optic nerve chiasma proves that an inflammation originating in the gland can very well produce a retrobulbar neuritis without bitemporal hemianopsia.

Unusual Changes in the Visual Fields Due to Vascular Lesions in the Brain and Optic Nerves. Clinical cases illustrating the following conditions are reported by W. C. Posey.[3] (1) Permanent quadrant and hemianopic losses following so-called "migrainous attacks"; (2) left eye blind from thrombosis of central artery of the retina, temporal field of right eye lost from cerebral apoplexy, right nasal field alone remaining; (3) unilateral optic atrophy and contra-lateral hemiplegia consequent on occlusion of the cerebral vessels; (4) monolateral nasal hemianopsia of the left eye from pressure atrophy in consequence of atheroma of the ophthalmic artery; (5) right homonymous hemianopsia confined to the macular regions from blocking of an end artery in or near the cortical center of the visual area.

Lesions in the Occipital Lobes Demonstrating the Cortical Area for Macular Vision. In a most important series of contributions to a study of the cortical areas for vision Byrom Bramwell[4] gives a report on the anatomic

(3) Archiv. Ophthal., September, 1915.
(4) Edinburgh Med. Jour., July, 1915.

findings in the following case which we give almost in its entirety, and in Bramwell's language:

M. McG., a man, of 45, came in February 1886, complaining of loss of sight. G. A. Berry reported that there was nothing wrong with his fundus. The loss of sight, which consisted of complete loss of peripheral vision with very marked reduction of macular vision, had come on suddenly, with an attack of what appeared to be uræmic convulsions, in June 1884.

The writer diagnosed the condition as probably due to a bilateral lesion of the occipital lobes in the region of the half-vision center. The case did not appear to be one of the rare cases of double homonymous hemianopsia, in which a lesion of one occipital lobe (say the right) produces a homonymous hemianopsia on the opposite (say the left) side, and a second and subsequent lesion in the other (say the left) occipital lobe produces a homonymous hemianopsia on the opposite (say the right) side, but a *simultaneous* bilateral lesion in the right and left occipital lobes—an infinitely rare, if not a unique, condition.

During the whole period (24 and one-half years) that the patient was under the writer's observation the condition remained, practically speaking, unchanged, and there were no further cerebral developments—central (macular) vision improved slightly, peripheral vision remained completely obliterated. Throughout the whole course of the case there was no motor paralysis, no loss of sensation, and no aphasia, either sensory or motor.

In April 1905 (twenty-one years after the onset of the lesion, and five years before the patient's death) A. H. H. Sinclair examined the patient and gave an exhaustive report on the condition of vision and of the fundi, and accurate charts of the fields of vision (see Figs. 3 and 4).

The patient died of acute croupous pneumonia on 21st October 1910, aged 71, and an autopsy followed.

A large lesion was found in each occipital lobe.

J. Shaw Bolton, the leading authority on the occipital cortex and the visual area, undertook the microscopical examination.

In summing up the results of his investigation he

states: "The histological investigation of this case may thus claim not only to have explained the clinical features present during life, but to have added to our knowledge of the part played by the visuo-sensory area in macular and in non-macular or panoramic vision. It may, in fact, be stated that the anatomical basis of the former is the cortex of the calcarine core of the pear-shaped visuo-sensory area, and that the anatomical basis of the latter lies in the surrounding and remaining visuo-sensory cortex."

A further conclusion, based upon the condition of macular vision for white and for colors as observed during life, may also be added, namely, that if there is a cortical centre for colour vision, the cortical macular center for white and for color vision is the same; in other words, that there is no separate cortical centre for color vision, as was at one time supposed. To this Shaw Bolton adds: "It is impossible to form any opinion, histologically, on the subject of color vision, and it is as certain as it can be from recent researches that color vision is the result of purely chemical processes which take place in the *retina.*"

The details of the case are as follows:

Acute general dropsy (probably due to acute nephritis); epileptiform convulsions; permanent loss of peripheral vision, the fields being enormously contracted; central vision both for white and for colours fairly good; fundi oculi normal; no mind-blindness and no word-blindness. The diagnosis, made twenty-four years before death, was "probably a bilateral lesion in the occipital lobes"; death at the age of 71, twenty-six and a half years after the onset, from acute croupous pneumonia. During these twenty-six and a half years there were no fresh head symptoms, and practically no change in vision, no motor paralysis, no loss of sensation, no aphasia, sensory or motor. On post-mortem examination a large lesion was found in each occipital lobe. Exhaustive microscopic examination of the visuo-sensory area by Dr. J. Shaw Bolton.

Previous History.—The patient stated that he had enjoyed good health until June 1884, when he had a severe illness, which seemed to have been acute nephritis

with uremia. The attack commenced with bronchitis and "stoppage of the water" (he does not know if the water was red or bloody); his face, body, and limbs swelled, and he lost his appetite. During the course of the attack he suddenly lost his eyesight, and almost immediately afterwards had a series of epileptic fits. He was unconscious for fourteen days; it was three weeks before he could recognize voices. When he regained consciousness he was quite blind; since then his eyesight (central vision) has been gradually restored in some degree.

Since he recovered from the acute stage of the attack his general health has been good; he now feels well, if it were not for the loss of sight; he is, however, "at times heavy and inclined to sleep." For some time after he recovered from the acute attack he occasionally suffered from headache, but the pain was not frequent and not severe; for the past year there have been no headaches. He has not suffered from giddiness or vomiting. His face has never swelled since he recovered from the acute attack. He has not had syphilis.

Condition on 24th February 1886.—The urine was absolutely normal, and the heart and other organs quite healthy; the patient was muscular and well nourished. There was no motor paralysis, no loss of sensation, and no aphasia, either sensory or motor.

The knee-jerks were normal; there had been no lightning pain; the pupils were of medium size, they contracted actively both to light and accommodation—in short, there was no suspicion of tabes.

Central vision for white was very defective (V = 3/18). The peripheral portions of the field were so greatly constricted that peripheral vision was nil.

There were no ophthalmic changes—a fact confirmed by Dr. Berry.

Subsequent Progress of the Case (*12th January* 1887). —The patient's general health is good. His sight is better; he says that he can see little objects, such as a pin on the floor, but that he fails to see larger objects, and often runs up against things, tumbles over his children, etc. Central vision has improved—right eye = 5/18 imperfectly; left eye = 3/18 imperfectly; cen-

tral color vision good. The condition of the fields at this date (12th January, 1887) is shown in Figure 3.

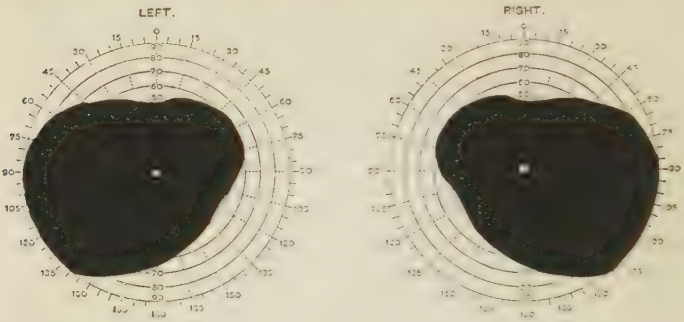


Fig. 3. Perimeter chart of the fields of vision in the case of M. M'G., described in the text, taken on 12th January, 1887. —Bramwell.

9*th March* 1891.—His general health is good. The urine continues quite normal; there have been no head symptoms—in fact no nervous symptoms at all, except the affection of sight. He stated that he sees objects distinctly when they are placed directly in front of him; and that he can see small objects, such as a pin or a small piece of white paper the size of a pea on the floor. I satisfied myself that this statement was correct. In order to see a small object on the floor in front of him he moves his head and eyes about (ranges over the area where he knows the object is) until he gets it in the line of central vision.

Central vision is fairly good—much better than it was four years ago; at 18 feet he correctly named with the right eye one of the test letters which ought to be read at 18 feet; and three out of five of the letters which ought to be read at 24 feet. (Right eye, V = 18/24 imperfectly.)

With the left eye he could not recognize any of the letters which ought to be read at 18 feet, but at this distance he correctly named three of the five letters which ought to be read at 24 feet. (Left eye, V = 18/24 imperfectly.)''

Vision was not improved by glasses.

Central vision for colors was perfect in each eye.

He says he cannot see anything at the sides, above or below. The fields of vision were again mapped out with the greatest care; the area of central vision was a

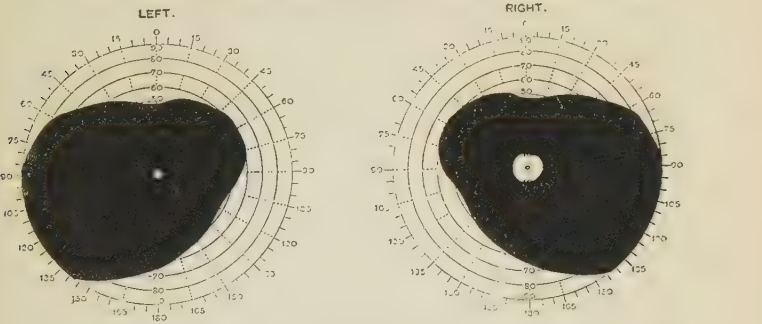


Fig. 4. Perimeter chart of the fields of vision in the case of M. M'G., described in the text, taken on 19th March, 1891.—Bramwell.

little, but only very little, larger than on 12th January 1887; the improvement was most marked in the right eye (Fig. 4).

The pupils contracted actively both to light and on convergence.

There were no abnormal ophthalmoscopic appearances.

The day on which these observations were made was particularly clear and bright.

His mental condition is not very bright, and he says his memory is not good, but there is no mind-blindness and no word-blindness. He walks about the streets without assistance, coming up every six months by himself to the Royal Infirmary to see me. He can read large type, such as the prices of objects in shop windows.

On 19*th May* 1891 the patient was admitted to the Edinburgh Royal Infirmary suffering from scurvy, under Professor Wyllie, who has kindly allowed me to see his notes. The attack had commenced twelve days previously, and had evidently produced marked (temporary) deterioration of vision and of the mental condition. The patient was stupid, his memory was poor, the vision very defective. He was discharged cured of the scorbutus on 18th June 1891.

8th January 1893.—There is no change in the general condition; vision is not so good as it was on 9th March 1891.

26th April 1894.—Does not feel so well; thinks his sight is not so good; is occasionally giddy; a strange feeling—"sort of weakness"—comes over him at times. His memory, he says, is impaired, but his visual memory (for places, objects, etc.) is not specially interfered with. He walked up alone from Leith to the Edinburgh Royal Infirmary today.

8th April 1905.—*In statu quo.* The patient continues to come up to the Infirmary every six months, as he has done regularly during the past twenty years. General health good.

A. H. H. Sinclair also made an exhaustive examination, and sent the following report on the ocular condition and vision:—April 10, 1905. There is some slight chronic conjunctivitis present in both eyes—right eye, V = 6/36 uncertainly; left eye, V = 6/36 and 6/24 partly. Central fixation is present, but is not perfect.

The field of vision is very greatly contracted, and more so on the left side in both eyes (Plate III). The fixation point is probably encroached upon on the left side in both eyes. The slightly larger extent of the right field corresponds to the patient's statement that he can see "a little wider with the right."

The pupils are small—3 mm.—react to light, and are equal.

The eyes move normally. Convergence and other movements are uncertainly performed, because of the failure in indirect vision.

The *ophthalmoscopic examination* shows both discs to have a somewhat leaden-grey atrophic appearance, with extensive shallow cupping, probably more than the original physiologic cupping.

There is a well-developed scleral ring round each disc—quite like the high-water-mark seen round the disc in glaucoma; though not in this case connected with glaucoma, it is an evidence of the atrophic process which apparently has been going on for a long time.

The general fundus shows in each case some tessellation of the choroid. In the left eye there are some slight

changes in the choroid between the disc and the macula.

The retinal arteries have a hard "silver-wire" look, but otherwise the retinal vessels are normal.

On 15*th June* 1905 the patient was admitted to the Edinburgh Royal Infirmary, under my care, suffering from scurvy of a fortnight's duration. He was discharged cured of the scorbutus on 7th July 1905.

2*nd June* 1910.—No change since the last note; general health good; walked up from Leith alone as usual to see me today; his memory, he says, is no worse; can read large type; can write, but does not write letters—his sight is so bad that the lines run into one another.

After the patient's death his daughter, with whom he lived, told me that she remembered his having one convulsion of recent years. He could, she said, read large type, and could tell the prices of objects in the shops. He only once, so far as she remembered, wrote a letter; it was very bad, for he wrote one line on the top of another. He never complained of his head; his memory was good, and his mind was all right. He was able to find his way about quite well.

Post-Mortem Examination. This was made on 22nd October 1910.

Head.—The dura mater was somewhat thickened and adherent at the vertex.

The arteries at the base of the brain were somewhat atheromatous—a marked patch of atheroma was situated in the right posterior cerebral artery just beyond its junction with the circle of Willis, and another on the left common carotid artery at its junction with the circle of Willis.

The convolutions of the brain, more particularly of the frontal lobes, were somewhat atrophied and separated by deep sulci—apparently a senile change.

A large lesion was present in each occipital lobe and a small superficial lesion in the adjacent part of the right temporo-sphenoidal lobe (posterior end of the middle temporo-sphenoidal convolution).

In the right occipital lobe an extensive lesion was seen (Plates IV and V), a marked depression in the middle of the lobe, and shrinking in of the convolutions, with discoloration, involving more particularly the upper and

middle convolutions; the lower convolution at its tip and the visual area (cuneus and calcarine area) appeared to be normal.

In the left occipital lobe there was a marked depression on the upper surface, apparently leading into a cavity in the interior of the brain (Plates IV and V). The surrounding convolutions were plump and apparently normal.

Viewed from the side, there was marked depression at the junction of the right occipital lobe with the back part of the temporo-sphenoidal lobe (Plate V). A small part of the posterior end of the right middle temporo-sphenoidal convolution was shrunken and atrophied (the result of an old softening).

There was also an area of superficial softening in the middle part of the middle and lower temporo-sphenoidal convolutions on the right side (Plate V); it was separated from the occipital lobe by an area of normal brain tissue, measuring one inch from before backwards.

After separating the cerebellum and looking at the back part of the base of the brain from below, there was a marked depression on the right side at the junction of the occipital and temporo-sphenoidal lobes. The convolutions of the occipital lobes (both right and left) on their under surfaces were plumb and normal.

The *brain* was injected with 10 per cent. formalin. On 12th November 1910 it was cut into three sections (Plate VIa). The lateral ventricles were greatly dilated (Plate VIb). The whole brain was sent to Dr. Shaw Bolton for further examination.

Nature of the Brain Lesion.—The brain lesion consisted in extensive destruction of the white matter and part of the cortex of the left occipital lobe and very extensive destruction of the white and grey matter of the right occipital lobe. The lesions apparently were the result of old softenings, probably, from the very sudden onset, embolic in origin, with great secondary (compensatory) dilatation of the lateral ventricles.

Lungs.—Right—the upper lobe, which was adherent, was consolidated by acute croupous pneumonia. On section, the affected area was found to be in a state of grey

hepatisation, almost gangrenous. *Left*—congested and edematous, but otherwise normal.

Heart.—This showed senile changes but no valvular lesion.

Kidneys.—Both were rather pale and somewhat atrophied, but not markedly abnormal.

Bladder.—This was much thickened and encrusted with phosphates—acute and chronic cystitis.

Shaw Bolton's Report. The fact that the visuo-sensory area generally is normal in distribution makes it certain that the gross contraction of the visual fields, which is found clinically, is due to an associative block, and that this block is not quite so complete on the left side of the visual apparatus as on the right (and in the right fields of vision as in the left), in association with a smaller or less important lesion on the left side of the cortex. This is indicated histologically by the disuse atrophy of the visuo-sensory cortex, which is everywhere marked, with the exception of the more central (calcarine) portion.

It would therefore appear that the calcarine core of the visuo-sensory area serves in some degree as an anatomical basis for macular as distinct from non-macular or panoramic vision.

This conclusion is supported by the fact that the lesion in the right hemisphere reaches up to the posterior portion of this calcarine core. This fact at the same time incidentally explains why in this case the right field of (central) vision was a little more extensive than the left.

It appears, therefore, to be probable that human macular vision is an evolution dependent on (1) the development of binocular vision *i. e.* on the employment of corresponding parts of the retinæ simultaneously, and on (2) the simultaneous development of the capability to pay prolonged and individual attention to particular points of the general visual panorama.

Macular vision is thus superposed on the neuronic apparatus for panoramic, and the two types shade into one another, the central parts of the retinae and the corresponding central (calcarine) cores of the pear-shaped visuo-sensory areas being the parts concurrently employed in macular vision.

The associative block caused by the lesions in this case, therefore, being greater on the right side than on the left, must thus be regarded as having been enough to stop the passage of the feebler panoramic stimuli without interfering seriously with the macular and stronger visual stimuli.

The continued passage of the latter has prevented the onset, in the calcarine core of the visuo-sensory area, of the disuse atrophy which elsewhere in these areas is general.

Lastly, the slight maiming of the right calcarine core posteriorly is responsible for the fact that the clinical visual field of the case was rather less extended on the left side.

The histologic investigation of this case may thus claim not only to have explained the clinical features present during life, but to have added to our knowledge of the part played by the visuo-sensory area in macular and in non-macular or panoramic vision. It may, in fact, be stated that the anatomic basis of the former is the cortex of the calcarine core of the pear-shaped visuo-sensory area, and that the anatomic basis of the latter lies in the surrounding and remaining visuo-sensory cortex.

TOXIC AMBLYOPIA.

Coffee Amblyopia and Its Relations to General Intoxication From Roasted Coffee Products. Casey Wood[3] reports this case from notes given to him by the neurologist, Harrison Mettler.

A woman, aged 53, noticed numbness in her toes, ascending to the knees and then to the hips; then numbness and pain in the arms. Pains in the arms and back, and weakness finally appeared. She also had poor eyesight for four years. Hearing was dull; speech troubled; reflexes were diminished; partial wrist drop. She drank from sixteen to eighteen cups of coffee a day.

Diagnosis: polyneuritis from excessive coffee.

Complete recovery including restoration of eyesight followed cessation of coffee drinking. Unfortunately,

(3) Ophthal. Rec., March, 1915.

there was no exact measurement of vision and fields, and no fundus examination was made.

Grave Toxic Lesions of the Uveal Tract and the Cranial Sensory Nerves Following the Therapeutic Use of Arsenobenzol. The twenty-eight cases are described individually by R. Arganaraz[4] and the following conclusions are presented:

1. Post-salvarsan optic neuritis, whether it be of syphilitic origin or from arsenic poisoning, is aggravated by injections of arsenobenzol.

2. In patients attacked by optic neuritis, the therapeutic use of salvarsan is contra-indicated.

3. Optic neuritis, being of slow evolution, and without suggestive symptoms at the commencement, ophthalmoscopic examination of the fundus of the eye is called for before submitting the patient to salvarsan medication.

THE OCULAR MUSCLES.

False Heterophoria and Heterotropia. E. E. Maddox[1] in his usual practical style, contributes an illuminating paper on this subject. He believes:

1. That false heterophoria need only be looked for in the presence of aniso-cyclotropia (spontaneous or artificial) combined with a swinging deviation, either of the eye spontaneously or of the image by a prism, or both.

2. That the amount of this error is a definite quantity, easily calculated by multiplying the two deviations together and dividing by 57 if all in degrees, or by 100 if all in centrads. For small deviations it is trivial.

3. That in paralyses of the vertically acting muscles, false elements of the diplopia are always present, the directions of which can be read off from his chart.

4. That the glass-rod test evades false heterophoria altogether if care be taken to keep the rods vertical or horizontal.

Ocular-Motor Paralysis of Otitic Origin. It is with the second or basilar division of the oculomotor nerves that otogenic lesions are intimately concerned, and it is also in this portion that rhinogenic diseases affect the

(4) Archiv. de Oftalmol., June, 1915.
(1) Ophthal. Rec., May, 1915.

nerve trunk. It is necessary that some account be taken of the latter, as well as the concomitant affection of the other oculo-orbital nerve trunks, in order to discuss the differential diagnosis of paralysis induced by disease of the auditory organ in the temporal bone from that originating in neighboring parts. The number of otogenic and rhinogenic lesions of the oculo-orbital nerves which have been published is small, but of these the latter are numerous and the former rare.

In describing the anatomic relationships of the oculo-orbital nerves to the temporal bone F. H. Westmacott[2] says that all the nerves are situated near the apex of the petrous portion, and well out of the way of disease limited to the organ of hearing, but extension of disease by bone or soft parts have different results. The oculo-motor nerve is, relative to the temporal bone, in the extra-dural portion and it is continued through the external wall of the cavernous sinus, being separated from it posteriorly by a thin membrane, while in front it lies in the blood-stream. It is, however, the most distal relation of the oculo-orbital nerves, from its superior position in the sinus. It is in this situation that it gets communicating fibers from the sympathetic plexus surrounding the internal carotid artery, which passes upwards at the apex of the petrous bone, close to the third nerve in the cavernous sinus. It also receives sensory fibers from the ophthalmic division of the fifth nerve.

Paralysis of all the muscles supplied by the oculo-motor nerve, without other muscles being implicated, is caused by a nerve lesion before its entrance to the cavernous sinus, a distance varying from two to three centimeters, and it is usually in this position that disease of the auditory apparatus and temporal bone attacks the nerve by continuity. In the cavernous sinus it is possible that the fifth, fourth, and possibly the sixth nerves will be affected, according to whether the pressure is from within the cavernous sinus (due to thrombosis or aneurysm of the carotid artery) or whether the pressure is on the external sinus wall. Disease of the sphenoidal cell is frequently in casual relationship with this mani-

(2) Lancet, Nov. 14, 1914.

festation, since the cavernous sinus and its contents are in close contact with the outer wall of the sphenoidal cavity in varying degrees, as described by Onodi. In the superior orbital fissure the nerve lesion would be accompanied by damage to the other oculo-orbital nerves. In both situations there would be unilateral, total ophthalmoplegia. If, however, a lesion affects all the nuclei of the oculo-motor nerve, there will be two additional factors—firstly, the cross fibers passing to the other eye are affected; and, secondly, the fibers arising from the seventh nucleus to the orbicularis oculi, close to the origin of the fibers of the elevator palpebrae, being attacked cause paralysis of the orbicularis and absence of the usual symptom in complete oculo-motor paralysis, that of the raised eyebrow on the affected side. A further point of importance would be the presence of abducens paresis or paralysis of the opposite side (associated fibers). Slight affection of the lateral rectus and superior oblique is sometimes observed in total paralysis of the third nerve, demonstrated by the field of fixation limitation in the lateral and infero-lateral part.

ORBIT AND EYEBALL.

Enucleation.

Exenteration Versus Enucleation. H. Gradle[1] has recently written much on this subject. He considers the question as to whether enucleation is preferable to exenteration, and in which case each operation is applicable.

He thinks enucleation is simpler and easier to perform; saves time for the patient, and is more nearly a perfect protection against tumor metastases; and that exenteration is less of a mental shock; causes less hemorrhage; is cosmetically better; allows of improvement in the size of the resultant stump; offers less dangers in purulent inflammations; and, if carefully performed, is a safeguard equal to enucleation in preventing sympathetic ophthalmia.

He also discusses the questions as to how far enuclea-

(1) Arch. Ophthal., January, 1915.

tion is preferable to evisceration in the prevention of sympathetic ophthalmia, and what greater danger from meningitis a patient runs in the enucleation of a panophthalmic eye rather than in its evisceration.

Gradle's conclusions are as follows:

There can never be any absolute indications formulated as to when to enucleate or when to eviscerate an offending eyeball.

But, with the previously mentioned factors in view, evisceration may be performed in all cases except those of malignant growth and phthisis bulbi, provided care be taken that no choroidal remnants remain adherent to the scleral capsule.

On the other hand, enucleation may be performed in all cases with the possible exception of very virulent panophthalmitis.

From an economic standpoint, enucleation is to be preferred when possible; but from a cosmetic viewpoint, evisceration is the operation of choice.

Removal of the Eyeball—Fat Implantation. The same writer[2] also discusses the transplantation of fat into the scleral or orbital cavity after enucleation. The first operator to use this method was Barraquer in 1901.

If fat is to be implanted in the scleral capsule, Gradle advises the excision of a quadrangular section of the sclera and cornea and the preparation of four flaps. The interior of the sclera must be clean and dry. Fat may be obtained from the gluteal region under local anesthesia. The incision should be parallel to the fascia. A piece of fat two centimeters in diameter is dissected out and preserved in sterile gauze. The fat is then inserted in the sclera and held in place with a broad spatula. The first pair of scleral flaps is then sutured and afterwards the second sutured over these.

If fat be implanted in Tenon's capsule, it is best secured by a purse-string suture.

In twenty-nine cases of enucleation the fat was extruded twice. In fifty-four cases of exenteration it was extruded six times. Out of five cases of beginning panophthalmitis in which fat was implanted, extrusion occurred in three. Infection is thus a contra-indication.

(2) Arch. Ophthal., March, 1915.

In one-half the cases the fat had shrunk to one-half the amount implanted. Shrinkage may be counteracted by the injection of sterile white vaseline.

Local Anesthesia in Enucleations and Exenterations of the Eyeball and of the Orbit. E. Seidel[3] has devised for these cases a new method of anesthesia of the first and second branches of the fifth nerve by orbital injection of 4 per cent. novocain-adrenalin solution. The maximal dose of adrenalin is 6 drops. The essential point is injecting a small quantity of a highly concentrated solution near the apex of the orbit through the infra-orbital fissure. The anesthesia is indirect, as the nerves and the ciliary ganglion are not directly injected but are gradually reached by the diffusion of the novocain into the surrounding tissues.

After disinfection of the skin with tincture of iodine, the needle enters one finger-width below the anterior portion of the inferior margin of the zygomatic bone, and the skin is superficially infiltrated. Then 6 ccm. are injected at the posterior surface of the supramaxillary bone into the pterygo-palatine fossa. Five minutes after these preparatory injections the posterior orbital injection is made with a hollow needle, 8 cm. long, not quite 1 mm. thick, provided with handle and mandrin, along the anterior margin of the masseter muscle toward a point on the top of the head, marked by placing the index finger on it. This point lies thumb-wide toward the other side from the intersection of coronary and sagittal sutures, and is found as follows: The head of the patient is turned backward so that the plane through both horizontal branches of the lower jaw is exactly horizontal. The border of a towel is placed vertically over the head from the anterior margin of one mastoid process immediately behind the external meatus to the other. From the point of intersection of the crest of the nose, produced backwards, and this meridional plane, thumb-wide to the other side lies the desired point. After the needle has been introduced for about 4.5 cm. the fibrous closure of the inferior orbital fissure is felt as resistance and perforated. The mandrin is removed, the syringe (containing 2 ccm.) inserted into the needle, and 1 ccm.

(3) Archiv. f. Ophthal., 89, p. 414.

injected, which causes slight exophthalmos, and after pushing the needle about 1 cm. deeper, another ccm. The needle is pulled back 2 cm. and simultaneously 4 ccm. of the solution injected as retrobulbar depot, *i. e.*, from 4 to 6 ccm. altogether. After 20 minutes the anesthesia is complete.

Gradle[4] also discusses this matter and traces the history of local anesthesia in the enucleation of the eyeball. He reports 236 cases of removal or exenteration, 146 of which were done by ciliary ganglion anesthesia. Of these 85.6 per cent. were successful in that there was the minimum of pain. He cites three contra-indications: (1) extreme youth, (2) neurasthenia, and (3) ruptured panophthmitis.

For the operation he directs that after the conjunctiva is anesthetized the injection is made with a needle 5 cm. long. The point of entrance is at the outer canthus, slightly above the median line, along the upper border of the superior rectus. After the equator is passed the needle should be turned sharply inward, and it is inserted into the orbit forming an angle of forty degrees with the antero-posterior axis of the eye until the inner orbital wall is reached. One or two cubic centimeters of novocain 1 per cent., combined with a little adrenalin, is used. A second injection should be made into the conjunctiva at the lower portion of the bulb.

Enucleation in Hemophilia. John Green, jr.,[5] gives the history of a patient in whom one eye was enucleated on account of the presence of a foreign body which could not be removed with the magnet, and who happened to be a bleeder. A copious hemorrhage occurred at the moment of cutting the nerve, pushing the globe in front of the palpebral aperture; the loose connective tissue of the lids rapidly filled with blood so that they became almost boardlike and a fat hernia protruded itself between the lids and could not be reduced by pressure. Hot bichloride compresses were applied and after a short time the hemorrhage ceased so that the conjunctiva could be approximated with sutures; but the herniated mass remained outside the lids. After smearing with vaseline,

(4) Archiv. Ophthal., May, 1915.
(5) Amer. Jour. Ophthal., September, 1914.

a pressure bandage was applied. The following day the blood-soaked dressing was replaced, but oozing continued. Then the history of hemophilia was obtained and 10 c.c. of normal serum were injected and after a few hours a second dose. Within twelve hours oozing ceased and recovery took place without further hemorrhage.

Green points out that in view of the fact that enucleation is an operation in which fairly large vessels and a great many capillaries are divided, and in which other resources for controlling hemorrhage are limited, it would be well to make it a practice to inquire of every patient on whom we propose to remove an eyeball, whether or not he is a bleeder. If there are any reasons for suspecting the presence of hemophilia, it would be well to guard against a possible hemorrhage by the prophylactic injection of normal serum. This procedure is harmless, has been used with success in general surgical work, and would probably avert the disconcerting occurrence here described.

Removal of Eyes in the Presence of Orbital Cellulitis. This subject, of such extreme importance to every ophthalmic operator, is discussed by W. T. Lister[6] who voices the general belief that to remove an eye in which there is panophthalmitis and an open wound in the globe is a risky procedure, and liable to be followed by septic meningitis if carried out in the ordinary way with division of the optic nerve.

To avoid this serious complication some surgeons merely eviscerate the globe and leave the sclerotic to shrink up, a process which, as a rule, takes about a fortnight or even longer. Others first eviscerate the eye, then, after carefully washing the sclera and conjunctiva, to remove, as far as possible, all septic matter, proceed to remove the sclerotic. In this way the process of healing is greatly shortened, and much less risk of infection of the sheath is run.

In dealing with eyes which have been penetrated or ruptured by bullets or large foreign bodies, there is usually orbital cellulitis more or less severe as a complication. In these cases it would seem that still greater risk of infection of the sheath of the optic nerve might exist, which in turn could easily be followed by menin-

(6) British Med. Jour., March 6, 1915.

gitis, if the remains of the eye be removed in the ordinary way with division of the optic nerve, and consequent opening of its sheath.

In order to prevent infection of the nerve sheath the following plan appears to be a good one:

1. The contents of the globe are thoroughly eviscerated, all traces of retina and choroid being scraped away to avoid any chance of sympathetic ophthalmia.
2. The muscles are divided.
3. The sclerotic is pulled forward and divided far back, leaving only a frill round the intact optic nerve.

The actual procedure may be varied according to the following circumstances:

(*a*) When the opening in the globe is small, or has firmly healed, the conjunctiva and muscles are divided first, as this is, of course, much more simply done while there is some tension in the globe. The cornea is then cut away and the contents of the eye carefully scraped out, either with a large sharp spoon or a scoop made for the purpose, and the process completed by scrubbing out the sclera with a swab held in a pair of forceps. The sclerotic is drawn well forward by two or three pairs of pressure forceps, and cut far back, leaving a frill round the nerve as described above.

(*b*) If the globe has an open rent or wound the contents should be scraped out first and the shell of sclerotic and conjunctiva thoroughly washed. The sclerotic is next packed firmly with a strip of gauze to facilitate the division of the muscles, which is next performed. The gauze is now removed, the sclera drawn well forward and divided as before.

(*c*) When the globe is split open in all directions, as is often the case when a bullet has passed through it, packing is impossible. In this case, after scooping and wiping out the contents of the eye, the separate portions of the sclera can be picked up and made taut with pressure forceps and the muscles dissected off as far back as possible. After drawing the bunch of forceps forward the sclerotic is cut through, as described above.

The three points to be kept in mind are:

1. To remove all trace of retina or choroid;
2. To take away the bulk of the sclerotic, but

3. To leave a frill of sclerotic round the intact optic nerve.

In this way all risk of infection of the nerve sheath and the meninges as the result of the operation is avoided; there is very little bleeding, the shock due to cutting the optic nerve does not occur, drainage for the cellulitis is afforded, and the healing process is not prolonged by leaving in the bulk of the sclerotic.

The same procedure would, Lister thinks, be the safest method of removing eyes with panophthalmitis.

Orbital Tumors.

Lymphoid Infiltration of the Orbit. George Coats[7] describes one of these cases, briefly abstracted in the *Annals of Ophthalmology* as follows: There was proptosis of the right eye forward and slightly upward and outward, of ten months' duration, in a man aged 37. Movements practically full. Firm resistance to backward pressure. Some enlargement of the retinal veins and blurring of the outline of the disc. Vision with correction, right eye, equaled 6/6 pt.; left eye, equaled 6/5. Exenteration of orbit. Seven years later commencing similar affection on the left side. Patient's health perfect throughout. Physical examination revealed no abnormality. Blood examination negative.

Pathologically: Orbital tissues strewn throughout with numerous isolated nodules of lymphoid tissues, situated chiefly in the fibrous trabeculae and along the larger vessels. These nodules are composed not only of lymphocytes, but also of fully developed lymph follicles. No special concentration of the changes in the vicinity of the fornix or lachrymal gland. No microörganisms demonstrable.

The only cases presenting a real resemblance to this one are two reported by Birch-Hirschfeld. Coats believes that these three cases belong in a special classification.

Coats gives a very clear exposition of present views on the lymphomatoses, their classification and their relationship one to another. Most symmetrical tumors of the eyelids and orbits belong in this group. Tumors are

(7) Archiv. Ophthal., May, 1915.

commonly multiple, and usually appear in the lymph glands simultaneously. They rarely invade the orbit deeply.

The origin of lymphoid tumors in the orbit are discussed, the author inclining to the view that they arise from pre-existing cells in the tissues, the condition being a local expression of a general over-activity of the lymphopoietic apparatus. The condition in his case probably was more closely related to the inflammation than to the tumor. It seems probable that the follicles may have been deposited in response to the inflammatory stimulus. Many features of the case are, however, obscure.

Diagnosis and Treatment of Bony Tumors of the Orbit. A report on these neoplasms is given by Charles Wray.[8] He gives Herschfeld's figures showing that the mortality in cases of sinus growths—frontal, ethmoidal and sphenoidal—is 48.2, 80, and 100 per cent., respectively; while the post-operative mortality is 13.6, 12.7, and 33 per cent. The two main methods of diagnosis are by palpation and the use of Roentgen rays. An examination by fingers is too limited; he advises the use of a thin, flexible spatula 10 mm. wide and 2 mm. thick at the ends; this presses on the skin under the supra-orbital notch, passed 15 mm. under the lid, and *via* the fornix 33 m.—*i. e.*, within 12 or 13 mm. of the sphenoidal fissure. The measurements at the lower orbital margin are 12 and 16 mm. respectively; while at the inner and outer canthus the distance reached is 15 and 21, and 11 and 22 mm.; and as the usual distance from the margin of the orbit to the rectal spine is 45 mm., it is possible thus to investigate half the outer wall of the orbit. In the living subject it is desirable to administer morphine an hour, and deep injections of novocaine ten minutes before beginning the examination.

With regard to operation, he laid stress on the importance of dissecting up the superjacent membrane if present, and the periosteum, so as to shut off, as efficiently as possible, the field of operation from the contents of the orbit. Having tested the hardness of the growth, an attempt should be made to test the strength of the attachment to the bone, as slight leverage might snap the

(8) Med. Press, May 5, 1915.

pedicle. If this does not occur and the tumor is cancellous it should be removed piecemeal, so as to discover its relation to the orbital wall. If originating from a subjacent sinus, and especially if of hour-glass shape, the bone should be cut away so as to allow of easy removal in the safest direction. Two important landmarks are the inner canthus (over the anterior extremity of the middle turbinated) and the anterior ethmoidal foramen (giving the level of the cribriform plate). Frontal sinus cases are the most frequent, and usually present at the upper and inner part of the orbit. No operation should be undertaken in the presence of material alteration of the roof of the orbit as revealed by *x*-rays. Ivory exostoses cannot be removed piecemeal. As in the cancellous variety, gentle leverage is in order, and in the event of failure, sufficient of the orbital wall should be cut away to permit of removal in the safest direction. A clue to the size and location of the growth is obtained by radiography and the use of a strong needle.

Removal of Epibulbar Epithelioma with Radium Bromide. Treacher Collins[9] gives an interesting account of this case. The patient was a man of 80, who presented a new growth, 10 mm. in diameter, at the limbus. Microscopic examination showed it to be an epithelial tumor which was extending into and filtrating the epithelial areolar tissue; it had formed in two years and was gradually increasing in size. Ten mg. of radium bromide on a circular disc 1 cm. in diameter, unscreened, was held continually over the growth for fifty minutes by a relay of assistants. The growth disappeared completely in a fortnight and after five months nothing could be seen except a smooth grayish scar.

GLAUCOMA.

Glaucoma and Blood-Pressure. A. MacRae[1] examined twenty patients with primary glaucoma as to their blood-pressure. So far as possible the observations were made at the same time of day, and approximately

(9) Med. Press, May 12, 1915.
(1) Ophthalmoscope, April, 1915; abstracted in the Annals of Ophtholmology, July, 1915.

the same interval after food, and under similar psychologic conditions. Seventy-one individuals were examined as controls. Martin's modification of the Riva Rocci blood-pressure apparatus was used. Three estimations were taken and the lowest reading tabulated. The intraocular tension was estimated with the Schiötz tonometer.

Arranging the figures in decades, the following are the results:

Age Period	Average blood-pressure Glaucoma cases	Controls	Glaucoma pressure Higher by	Lower by
40-49.....	140 (6)	134 (21)	6 mm. Hg.	.....
50-59.....	148 (4)	160 (29)	.....	12 mm.
60-69.....	154 (10)	159 (21)	.....	5

(Number of cases examined in parenthesis.)

The writer's figures, like those of Kramer and Kummell, are not uniformly either in favor of or against the theory that the average blood-pressure in glaucoma is high. But while their figures tend on the whole to favor the theory, his, on the other hand, tend to oppose it; as at only one age period was the average blood-pressure of the glaucomatous in his series higher than that of the controls.

In order to see whether it was possible to find clinically any confirmation, in the human subject, of the relation between blood-pressure and the eye-pressure which Henderson and Starling found in animals, the following experiments were performed:

The pressures of three young patients of an age at which the Riva Rocci may be presumed to give the genuine blood-pressure were taken. They were then directed to take a short period of violent exercise—running up and downstairs—in order to cause a heightening of blood-pressure. On their return the pressures were taken again.

In each case the blood-pressure was considerably heightened by exercise, but in only one case was there any heightening of the eye tension; and in a second experiment in this same patient, the opposite effect was produced.

These experiments in no way indicate that the eye-pressure in man alters with the blood-pressure.

With the other points brought out, they suggest that an altogether exaggerated importance has been given to the blood-pressure as a factor in maintaining or increasing eye tension. That it does help to maintain the eye tension no one will deny. But the eye tension may be affected in many ways which have no connection with, and no effect on, blood-pressure; and conversely, the blood-pressure may alter greatly without any corresponding effect on eye tension being observable. That blood-pressure is of any importance at all in the causation of glaucoma is very doubtful. It is at least likely that the solution of the long-standing problem of the etiology of that disease may prove to be a chemical one, with the well-known phenomenon of osmosis as its base.

The Colloidal Theory of the Pathology of Glaucoma. J. A. McCaw[2] discusses this well-known subject and says that just what the chemical changes in the eye are in clinical cases of glaucoma, no one is able to state definitely. We may infer that the cause of the edema is the same in the essentials as that of the more general ones. In a large number of glaucoma cases circulatory disturbances in the eye which permit of an accumulation of carbon dioxide and the abnormal development of such acids as are a constant accompaniment of states of lack of oxygen, are unquestionably present.

[It has always seemed to the Editor that the edema hypothesis, so far as it relates to the causation and treatment of glaucoma, is decidedly lacking in many details that both the clinician and the histologist have a right to demand. Exactly what tissues are affected by the edematous change? How does the edema interfere with the intra-ocular circulation? In what forms of the disease and in what stage or stages of each does it appear? Is there any practical relation between the colloidal state and an antacid therapy?—Ed.]

The Leech-Bite Incision for Glaucoma. Frank Todd[3] has invented an instrument intended to secure all the benefits of this operation and yet to avoid its difficulties. It consists of a knife which makes a leech-bite incision, *i. e.*, three lines proceeding from a central point, thus

(2) Ophthal. Rec., June, 1915.
(3) Ann. Ophthal., July, 1915.

producing three flaps, an incision very difficult to close. While this incision remains open and allows satisfactory filtration under the conjunctiva from the anterior chamber, no scleral tissue is removed, and weakening of the sclera does not take place, so that there is less liability to protrusion of the ciliary body into the opening than when a large opening is made, as with the trephine, when a portion of sclera is removed.

In performing the operation with this instrument a conjunctival flap may be dissected up or the knife may be shoved under the conjunctiva well above the margin of the cornea. The point of the knife may then be slid along between the conjunctiva and sclera until it reaches within 2 or 3 mm. of the cornea when it should penetrate the sclera and enter the anterior chamber, being as quickly withdrawn. If prolapse occurs, iridectomy is performed.

Limbal Puncture in Glaucoma. D. Priestley Smith[4] describes this operation which he has performed with ideal results, three times for buphthalmos and seventeen times for glaucoma. The operation is not new, having been performed by Solomon, Hancock, Pritchard and others, but never in the manner employed by Smith.

When performed for buphthalmos, it is done as follows: the puncture consists of a radial slit through the limbus, angle of anterior chamber and periphery of iris, into the vitreous. The ocular conjunctiva is seized 4 mm. above the corneal margin and drawn down over the cornea until the limbus is peeled of its own conjunctiva and covered only by that stretched down from above. This traction also turns the eye down. The globe is next pierced to a depth of about 5 mm. at the limbus perpendicular to the surface of the globe, the Graefe knife being held with its back toward the visual axis and the blade aiming for the center of the globe. The knife is withdrawn and the conjunctiva is released and goes back into place and covers the wound in the limbus.

The procedure in adults differs in one vital point from that in buphthalmos, namely, the direction of the knife necessary to avoid the lens. The back of the knife must be *parallel to the visual axis*. In a few persons over 50

(4) Ophthal. Rev., February, 1915.

the lens reaches a diameter of 10 mm. but not more. If the clear cornea is less than 11 mm. across in the meridian in which the puncture is to be made (usually the vertical), the knife must be entered outside the limbus, always being kept parallel to the visual axis. Except in cases in which the periphery of the iris is adherent to the back of the cornea, the knife thus directed can always open the anterior chamber without touching the lens, for the chamber is always wider than the lens. In many cases there is a trickle of blood down the anterior surface of the iris showing that the anterior chamber has been opened.

In buphthalmos, there was one case arrested, one unchanged and one forlorn hope lost. In adults hopeless cases were selected and 17 punctures were made on 11 eyes. The favorable results included three cases, one of absolute glaucoma in which T+3 was reduced to T+1; another, an instance of late acute glaucoma in which T+3 was reduced to normal; and a third, chronic glaucoma, on which three other operations had failed. In no case has the operation done any harm of any kind.

In a few cases the conjunctiva will not peel off. Although the anterior chamber is opened its depth is seldom noticeably altered, for the knife taps the vitreous also, and the two chambers being therefore in communication the escape of fluid lowers the pressure in both equally, and the anterior chamber is not emptied by superior pressure from behind as happens when it alone is tapped.

Sclerectomia ab Externo in Glaucoma. The following modification of the Lagrange sclerectomy is described by S. Foroni.[5] After injecting a few drops of novocain-adrenalin under the upper portion of the ocular conjunctiva, it is grasped with a toothed forceps, 1.50 cm. above the corneal limbus, and, by a von Graefe knife with the back toward the sclera a horizontal incision is made, forming a flap of 2.50 cm. long and 1 cm. high, which is carefully dissected down to the limbus. A scleral section is made near the limbus and parallel with it, the point of the knife being held vertically to the sclera. One mm. above this a second equal section is made and the circumcised piece of the sclera is cut off with scissors. The

(5) Archiv. f. Ophthal., 89, p. 393.

conjunctiva is sewed by a continuous suture, which remains for from seven to eight days. The writer performed this operation with good results in the different forms of glaucoma, keratoconus, detachment of the retina, and hydrophthalmos. He also used it with iridectomy in cases of total anterior synechia with complete abolition of the anterior chamber, and for optical purposes.

Foroni claims considerable advantages of his operation over those of Lagrange and Elliot. It is easier than the former, and the cleft, made in the sclera gives a better access to the iris (if this has to be operated upon) and furnishes a larger area of filtration corresponding to the obliterated angle of the iris than the circular opening of Elliot. The decrease of tension is attained at once and is permanent. Foroni saw in no case early or late infection, or striped keratitis.

Sclero-Corneal Trephining. A. Quackenbos[6] considers the complications and failures in 100 cases of glaucoma operated on by corneo-scleral trephining. The operation was done in acute, hemorrhagic cases, secondary to trauma, and in congenital, and chronic cases. A 2 mm. trephine was the instrument of choice. Three of the patients were operated on twice. The conjunctiva was buttonholed twice, but no bad effect was observed. In no case did the trephine button fall into the anterior chamber. The writer found it comparatively easy to do an iridectomy and believes it should be done in all cases. There was loss of viterous in three cases, with no interference with the success of the operation. Quiet iritis occurred in a few cases and the author believes this to be the principal danger to be guarded against immediately after the operation. In two cases of simple chronic glaucoma there was a severe iridocyclitis. Atropine was used only in cases showing signs of inflammation. Persistent low tension occurred in one case. Separation of the choroid occurred in one case, and late infection in one case. Ten cases were not relieved by operation, and most of the cases that came to enucleation were of the hemorrhagic type. Quackenbos concludes that the operation is best adapted for cases of simple chronic glaucoma. It is not difficult and can be performed with little danger;

(6) Archiv. Ophthal., 43, p. 600.

an iridectomy should be done if possible, the conjunctival flap should be sutured, and a sharp watch should be kept for iritis. Late infection is a serious danger.

The Tragedy of Sclerostomy. Under this title T. Harrison Butler[7] gives an account of eight cases of *late infection following sclerostomy* by the Holth punch operation. The cases are divided into three groups: (1) Acute cases, ending in acute uveitis and panophthalmitis, necessitating removal of the eye; (2) cases of severe iridocyclitis, which destroy the sight; (3) cases of mild iritis and local inflammation round the aperture, which recover.

Three of the eight cases were included in the first group, one in the second and three in the third. Brief descriptions of the cases are given. Every kind of scar was effected. In one case there was apparently firm cicatrization with no filtration; others had ectatic scars. In two a small buttonhole was made at the operation, which is considered an added danger. A thick flap of conjunctiva was always attempted, a thin covering to the aperture being obviously unsafe.

While the writer's cases were mostly healed with the punch, and therefore his conclusion can not be applied to the trephine operation, he concludes that late infection is a peril hanging over every eye which possesses a filtering cicatrix of any type, however obtained.

The Sclero-Corneal Seton in Treatment of Glaucoma. In an attempt to procure such capillary drainage of the anterior chamber as will insure a uniform and permanent outlet for the pent-up intra-ocular fluids—the chief desideratum in the treatment of chronic glaucoma—Casey Wood[8] has had recourse to the following procedure:

A narrow Graefe knife, with a hole near its point, is

Fig. 5. Knife used in Sclerocorneal Seton Operation.

introduced and passed in precisely the same fashion as in the preliminary steps of an anterior sclerotomy. The puncture and counter-puncture are made entirely in the

(7) Ophthalmoscope, August, 1915.
(8) Ophthal. Rec., May, 1915.

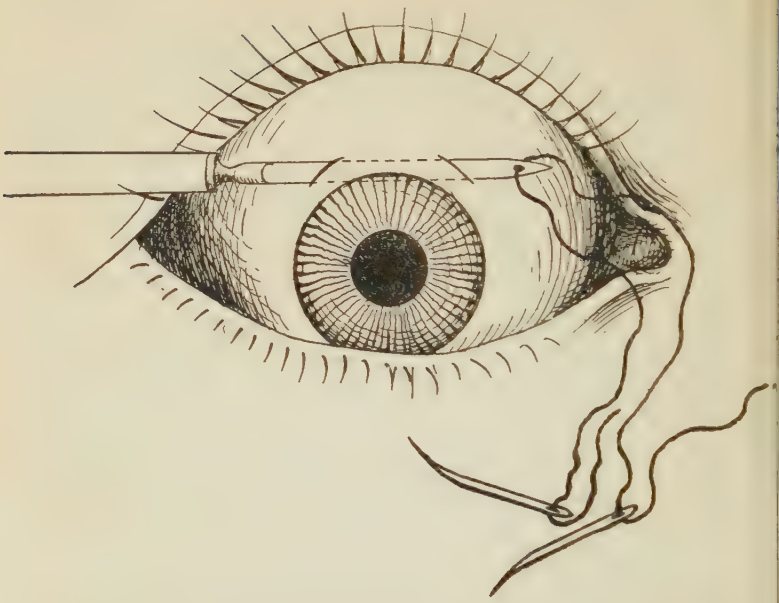


Fig. 6. Introduction of the knife as for an anterior sclerotomy.

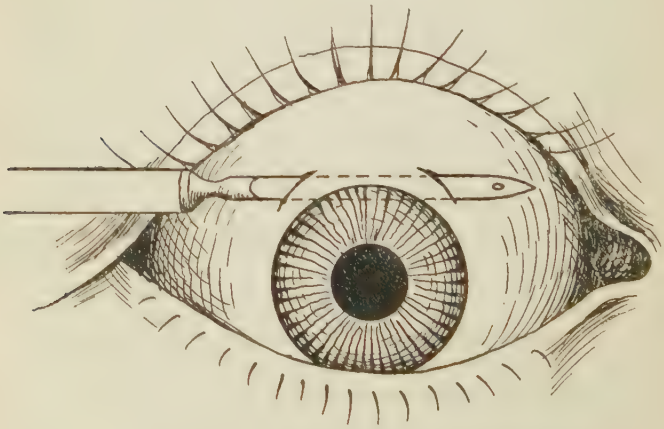


Fig. 7. Threading the knife with a double-needled suture.

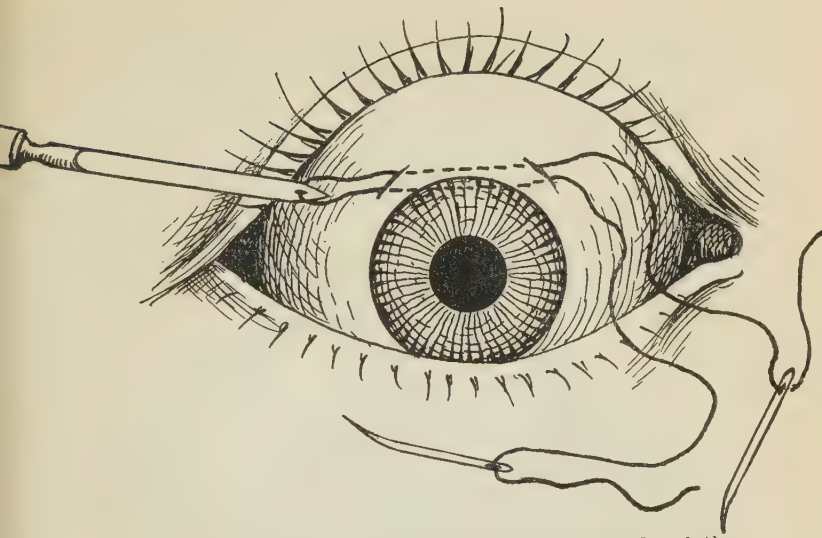


Fig. 8. Withdrawal of the knife so that the cut ends of the suture may be armed with two additional needles.

sclera, but as near the clear corneal margin as possible, so that at least one-half the operative wound communicates with the anterior chamber. When the point of the instrument emerges from the globe at the counter-puncture one needle of a double-armed, white, "OO," braided, silk suture, about eight inches long, is passed through the hole in the knife point. After a number of trials it was found that a half-curved needle is better adapted to the purpose than a straight one. It should be just large enough to pass easily through the eye of the knife, and should not be more than two-thirds of an inch long. Thus armed, the knife is withdrawn, so that about the same lengths of double suture protrude from puncture and counter-puncture. The knife is next freed from the sutures with scissors, and the first needles are with a needle-holder separately passed (by way of the counter-puncture wound) in different directions and for the length of the needle, beneath the ocular conjunctiva. The loose ends of suture corresponding to the puncture opening are then threaded and the same maneuver is

practiced on that side. The so-called split- or patent-eye needle is most useful here, since a wet, sterilized suture can be immediately threaded upon it; otherwise valuable

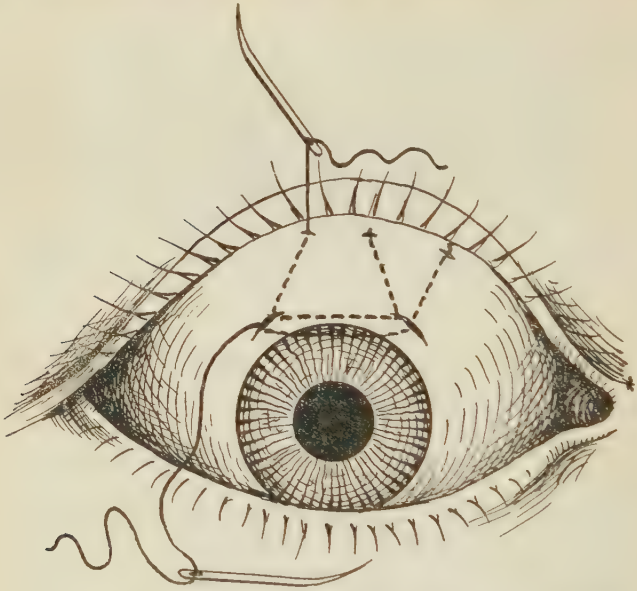


Fig. 9. Three of the sutures in place beneath the conjunctiva.

time is sure to be lost in vain attempts to pass damp thread through the eye of the ordinary needle. See the illustrations in the text.

Retained Silk Thread or "Seton" Drainage From the Vitreous Chamber to Tenon's Lymph Channel for Relief of Glaucoma. D. T. Vail,[9] for the relief of an absolute glaucoma, passed a threaded needle through the coats of the eye in the region of the ora serrata and brought it out at a point about eight millimeters distant. The thread was buried under the conjunctiva. At the end of three months the thread was removed. The tension was lowered to normal, and there was no return of the disease for two years, when the patient died.

(9) Ophthal. Rec., April, 1915.

Aqueoplasty, or the Zorab Operation for Glaucoma. Casey Wood[1] describes and is impressed with this procedure. Zorab's operation consists in inserting a loop of silk into the anterior chamber through a scleral or sclerocorneal opening and imbedding the threads beneath the conjunctiva. Several satisfactory results were exhibited at the Oxford Ophthalmological Congress of 1914. Wood has now performed the operation on two eyes blinded by glaucoma, and the results were quite satisfactory.

[Since the above was penned the drainage of the operative wound continues to be good and the Editor has done several additional operations, all satisfactory.—Ed.]

INJURIES OF THE EYE.

Birth Injuries of the Eye. C. P. Small[1] gives a report of a rupture of Descemet's membrane during labor. The patient, aged 11, still presents three distinct linear opacities extending vertically across the entire right cornea. In addition to the corneal injury there is a partial opaque lens, dislocated upward. There is a tremulous iris which accompanies this condition. There is atrophy of the optic nerve and a slightly increased intraocular tension. Vision is reduced to counting fingers at four inches. The lower edge of the lens seems to be less curved than it usually appears in this condition, and much darker in color than the remaining portion of the lens. There is also an obstetrical forceps scar on the lower eyelid.

Injury to an Eye From a Bursting Golf Ball. R. H. Elliot and W. S. Inman[2] point out that this accident is not uncommon in America but rare in England; the bibliography appended contains the names of eleven American reporters.

The accident is due to the fact that the cores of golf balls are surrounded by machine-wound india-rubber ribbons, thus subjected to great pressure when cut open, the contained fluid is expelled with great force. The contents seem to vary. The liquid first used was water,

(1) Ophthal. Rec., April, 1915.
(1) Ophthal. Rec., August, 1915.
(2) British Med. Jour., March 20, 1915.

but this was supplanted by a heavier fluid. Analyses have shown such contents to consist, in some cases, of a mixture of barium sulphate, soap and a fine alkali, sometimes with the addition of 2 per cent. of sodium hydroxide; in other cases dilute sulphuric acid, or a paste of chloride of zinc and soap, or a mixture of chloride of lime and soap, or a solution of chloride of zinc.

The accidents reported have all been due to the balls being cut open and not to their bursting during play. A review of the recorded cases shows the following points of interest:

1. The damage done is of a very serious nature—in most of the cases the injured eye either became blind or vision was reduced to the power of counting fingers at a short distance.
2. A large percentage of the cases are in children or young people.
3. In at least two cases the victim was not the person who was opening the ball, but a child who was looking on.

The practical point is the consideration of preventive steps. Air and solid core balls are quite as effective as the dangerous fluid core balls; hence there is absolutely no excuse for the manufacture of the latter. Warnings have been issued against the dangerous practice of cutting open golf balls; such warnings should be widely and continuously repeated by medical men.

Penerating Injury to the Eye From Broken Spectacle Glass. Sydney Stephenson[3] gives the history of a patient who suffered from a perforating wound of the cornea inflicted by a piece of broken lens, her glasses having been smashed as a result of an accident. He points out that injuries to the eye by broken spectacle lenses are admittedly rare. Hans Lauber, among 150,000 ophthalmic patients, found 5 (or 1 in 30,000) who had sustained this kind of accident. Such accidents as a rule are of a description to which people are exposed but exceptionally. For example, in the five cases related by Lauber the injury resulted from a railway collision, the explosion of an acetylene lamp, a knock against a metal wardrobe-number, a blow from a ball, and an injury from

(3) Lancet, July 10, 1915.

an animal's hoof. It has even been suggested that glasses may sometimes protect the eyes from injury either by diminishing the force of a blow or by changing its original direction. A case is known, indeed, where a chip of metal, weighing 600 milligrams, had shattered the glasses, but left the eye beneath intact (Hirschberg). Lauber believes that spectacles are, speaking generally, more dangerous than eyeglasses, inasmuch as the latter drop off more readily than the former. The question as between framed and rimless spectacles or eyeglasses is more difficult to decide, since those most exposed to injuries seldom wear the rimless forms. Of the ten cases of injury to the eye by broken lenses, one was in a child, one in an old man, and the remainder in young men.

[Vreeland has recently circularized the ophthalmic surgeons of America relative to these accidents and presented a report thereon to the Chicago Ophthalmological Society. His conclusions tally with those of Stephenson and with the Editor's opinions expressed in the report of a case of injury recently recorded in the *American Journal of Ophthalmology*.—Ed.]

Vitiligo of the Lids and Poliosis After Contusion. This condition is described by K. Steindorff.[4] A woman, aged 25, sustained at the age of about 4 years, a contusion on the left side of the forehead, without hemorrhage. After some time the hair at the vertex in an area of the size of the tip of a finger, and a vertical stripe of the skin of the forehead, 1 cm. wide, became white. Then the corresponding portions of the eyebrow, skin of the upper lid, and the lashes of both lids turned white. Soon the hair regained its former color and after a few years the skin of the forehead became normal, but the eyebrow, skin of the lids, and lashes, remained light. Microscopically the cortex of the epilated lashes contained not a trace of pigment. The medullary substance appeared as a dark stripe composed of very fine dots, which disappeared in hot water, showing that these were not pigment granules, but air.

Vitiligo and canities of the lashes after blunt injury, as in this case, have never been observed before, and there is only one publication on traumatic vitiligo by Chajes.

(4) Klin. Monatsbl. f. Augenheilk., 52. p. 188.

The writer assumes a tropho-neurotic affection, due to disturbances of blood and lymph circulation caused by the lesion of the trophic nerves of the forehead. This is supported by a case of Cassirer who saw in a nervous woman, aged 20, of a nervous family, after a strain combined with fright, left-sided ptosis, miosis and sudden canities of the medial portion of the eyebrows, lashes and the thin and scanty hairs of a mustache. The oculo-pupillary symptoms disappeared, but the canities remained.

There are reliable observations of sudden canities over night. These can only be due to accumulation of air, not to disappearance of pigment.

Copper in the Vitreous. T. von Speyr[5] reports that the left eye of a man, aged 21, was injured in the forenoon by explosion of a cartridge capsule. V=0.5 The cornea showed a fine linear injury, the iris an irregular hole, 1 mm. square, the lens a corresponding opacity, and the vitreous a light yellow, metallic luster. In the evening, under illumination of a Nernst lamp, a small pair of forceps with excavated ends were, under local anesthesia, twice introduced through a meridional section of the sclera, 7 mm. long, between lateral and inferior rectus, after previous dissection of the conjunctiva, but did not grasp the foreign body. After the second attempt the copper fragment appeared in the wound evidently following the traction of the vitreous, caused by the withdrawal of the forceps. The writer emphasizes this point, as perhaps the current of fluid may in similar cases suffice for extraction of a foreign body, so that it will not be absolutely necessary to seize it, as repeated attempts entail considerable damage to the vitreous tissue.

The wound was closed with scleral and conjunctival sutures. Seven weeks later the cataract was extracted. There were no opacities of the vitreous. Steindorff advises extraction of the foreign body as early as possible, and not to wait for formation of exudates.

Purulent Meningitis Following Penetration of an Eyeball by a Fishhook. A case of penetrating injury

(5) Klin. Monatsbl. f. Augenheilk., 53, p. 195.

of the eye by a fishhook, is reported by C. E. Veasey,[6] the fishhook remaining in the eye seven hours before removal. On removal of the hook, enucleation was advised and declined. Fifty-seven hours after the accident the eyeball was enucleated, and twenty-four hours later meningitis occurred, followed by death three days later.

Birdshot Removed From the Vitreous Through the Pupil. The following account of this occurrence is given by Kaspar Pischel.[7]

The patient was a boy, aged 12. While hunting, a birdshot No. 9, fired from his companion's gun, at a distance of about 50 yards, entered his left eye. The sight was immediately gone. The local physician gave him 10 c.c. streptococcus serum. The writer found:

Right eye: Sight 5/4, fundus normal.

Left eye: One mm. up and inward from center of cornea was a triangular gray flap; lens was cataractous, swollen; iris showed a tear in pupillary margin corresponding to the corneal wound. Fundus was not visible. Pupil dilated irregularly with several posterior synechias after atropine. The roentgenogram showed a shot in the vitreous downward inward from the center.

In consultation, the opinion was divided between removal of the eyeball and preserving it.

Patient was sent home to the country. Two months later the pupil in upper part was clear. With transilluminator; gray floating membranes could be seen in the vitreous.

Nearly three months after the accident the patient returned again, and gave the following history:

The day before, while wrestling with a boy he fell on him and bumped his head against the other boy's. He immediately felt a sharp pain in the left eye, lasting several hours.

To Pischel's astonishment the shot lay now in the lowest part of the anterior chamber, whence it was removed under a general anesthetic. Apparently the fall forward and the striking of the head had caused the shot to pass through the pupil into the anterior chamber. The eye quieted down rapidly.

---

(6) Arch. Ophthal., January, 1915.
(7) Jour. Amer. Med. Ass'n., Oct. 9, 1915, p. 1232.

This accidental occurrence shows us a way for the therapy in such cases, and the writer suggests removing the cataract as soon as possible and then trying to bring the shot into the anterior chamber through the pupil by methodical stooping exercises and even judicious bumping of the forehead while lying flat on the abdomen.

Triple Rupture of the Choroid, with Iridodialysis. L. F. Appleman[8] gives a history of this injury—one of a not very numerous class. The patient had been struck in the left eye with a baseball two days previously. The anterior chamber was about half full of blood, through which the upper portion of an iridodialysis could be seen dimly in the lower inner quadrant, but no details could be made out in the deeper structures. There was ecchymosis of the conjunctiva, especially in the lower outer quadrant. But little pain was complained of, although there was some pressure-soreness. V= R. 6/9; L. 1/60. He was given atropine solution and a boric-acid wash. Two days later, the hemorrhage had been absorbed except a small amount at the lower angle of the iris-tear, which was then seen to be about 5 mm. in length. With the ophthalmoscope a good red reflex was seen through the coloboma and the pupil. The vitreous was very hazy on account of large opacities, probably due to hemorrhages. The disc and blood-vessels could be located, but the details were not seen.

Absorption and clearing of the opacities progressed favorably under the use of dionin and heat, in addition to the atropine.

An examination, made sixteen days after he was first seen, showed large floating vitreous opacities, but the general view of the fundus was clearer. The retinal veins were full, especially the inferior temporal. Two long vertical ruptures of the choroid were seen, one irregular, beginning above the level of the center of the disc about one-half a disc's diameter to the nasal side and curving downwards, with the concavity towards the disc, nearly to the lower pole of the eye—this tear was narrow, about two or three times the width of a retinal vein; the other was seen, concentric with the disc, about

(8) Ophthalmology, October, 1915.

two and a half disc's diameter to the nasal side in the mid-zone, more irregular in outline and in its widest part about four times the width of the first.

One week later, the vitreous opacity had still further absorbed and a third long, narrow rupture was observed, beginning also on the nasal side of the disc, about two discs' diameters from it and apparently 2 to 3 mm. to the temporal side of the upper extremity of the first tear described, and curving upwards and towards the temporal side. Vision, 6/30.

After the vitreous opacities had still further cleared, several irregularly shaped erosions were seen between the disc and macula. There was evidence of some disturbance in the macula, and his vision when last taken was one letter of 6/21.

Sympathetic Ophthalmia. A. Jess[9] of Giessen gives Mackenzie full credit for the first recognition of sympathetic ophthalmia as a clinical entity.

A good description of the clinical picture follows, although but little space is devoted to sympathetic irritation. He regards the essential feature of the disease to be the irido-cyclitis. Many complications, as secondary glaucoma, phthisis bulbi and even retinal detachment, may arise. But these are distinctly sequelae, although the latter may precede the uveitis.

Jess believes that the main therapeutic agent is mercury. He acknowledges the worth of sodium salicylate, benzo-saline, salvarsan, etc., but finds such a diversity of opinion among the various authors that a therapeutic unanimity is out of the question.

This is a very complete study of the question of sympathetic ophthalmia, based principally on the literature, and very well worth reading in the original. It is pleasing to see that the bibliography is international in character.

[In this connection one should not forget Gifford's prescription of atophan and novatophan, which in much the same doses, he finds superior to sodium salicylate. He gives his experience of these remedies in sympathetic ophthalmia in the *Ophthalmic Record*, July, 1914.—Ed.]

(9) Probevorlesungen, 1914.

Is There a Sympathetic Amblyopia? This question is answered practically in the negative by J. Keutel.[1] He says that of forty-eight cases published as sympathetic amblyopia, Schirmer, in his article in Graefe-Saemisch's handbook, weeded out twenty-three, so that twenty-five remained, although some authors did not concede the existence of a sympathetic amblyopia, especially Elschnig, Pfalz and Peters. The writer again critically investigated the cases admitted as such by Schirmer, also the later ones, which are discussed in more or less detail. His conclusions are that none of the cases can bear severe criticism. Some emphatically prove that functional disturbances of the central nervous system play an important part, aside from the possibility of simulation. It seems, therefore, time to eliminate sympathetic amblyopia as an independent clinical picture from ophthalmologic literature. The explanation in the majority of cases in which after enucleation vision improved is that irritative symptoms—photophobia and lachrymation—ceased in patients who previously had mechanically and functionally diminished vision; or suggestive influences existed, which affected a speedy improvement in the amblyopia and the coincident contraction of the visual field.

Nervous Symptoms After Ocular Contusions. A valuable contribution to the study of *nervous symptoms from contusion of the eye* is that of E. R. Williams.[2] He discusses these traumas and divides their consequences into: (1) surgical shock at the time of the accident, its relation to cerebral concussion, its exaggeration by psychic influences, as, for instance, the emotions of fear, anxiety, etc.; (2) psychic shock of the eyeball, subdivided into two classes: (*a*) shock causing reduced vision without permanent damage of the retina, (*b*) shock effecting serious retinal damage, with permanently reduced vision; (3) traumatic delirium, often a complication of head injuries, eye operations, etc.; (4) traumatic neuroses, tending to incapacitate the individual from quickly resuming work, and necessitating special after-treatment; (5) permanent damage to different internal parts of the eye.

(1) Klin. Monatsbl. f. Augenheilk., 54, p. 250.
(2) Trans. Amer. Ophthal. Soc., p. 40, 1915.

In *characteristic shock symptoms* the patient, on being hit on the eye, usually staggers and sinks to the ground, where he remains dazed, but conscious. In several instances the patient loses consciousness several minutes. He groans or cries out in anguish. Severe pain in the globe may come instantly, but sometimes is delayed an hour or more; with severe blows it persists one or several days. The individual feels faint or chilly, looks pale and haggard, is nauseated, and often vomits. Being much weakened, he staggers if he attempts to walk. The pulse is weak and rapid, due to the decrease of blood-pressure. These shock symptoms are usually gone after the first night's sleep. Disturbing dreams occurred in two of these cases. The prostration, both mental and physical, often will last several days.

Psychic shock of the eyeball was studied by von Merz (*Klin. Monatsblätter für Augenheilk.*, Beilageheft, 1907), who had many opportunities to treat eye patients during the Russo-Japanese war. The most interesting contusion injuries of the eyes were caused by air concussion following the bursting of shells. He divided his cases into two classes: (*A*) psychic shock; (*B*) a paralytic dilatation of the vessels between the retina and the choroid (Beck's theory).

A. If shock alone is present, there occurs a molecular change in the structure of the retina, but one which is neither macroscopic nor microscopic.

B. If transudation of fluid from the choroidal vessels occurs (even in small amounts), the delicate retinal elements will be more or less destroyed. Ordinarily, there is no ophthalmoscopic change seen. Vision may never be regained, and, later, an atrophy of the optic nerve will be seen.

Williams further says that in the *traumatic neuroses of globar contusions*, if the injury is severe enough to have the patient admitted to hospital, it seems best to him that he shall be kept quietly in bed, at least one day—just as cerebral concussion cases are handled. Worry over the condition of the eye and doubt about the final outcome will often be enough to start true traumatic neurosis. An excellent plea for careful watching of all such accident cases during convalescence has been made

by J. J. Thomas ("Modern Treatment of Nervous and Mental Diseases," p. 439). He believes that those who treat contusions of the eye should realize that a great deal can be done to prevent the development of neuroses by the proper care of the patient during the late convalescence. After the healing of his wounds or after the first shock symptoms have subsided it is not good practice to discharge the patient and tell him he is fit to resume work. The individual does not always feel cured; he is still nervously weakened, and consequently timid of serious complications which may affect the restoration of his full eyesight. The effect of attempting to resume his duties, especially if they are intellectual, is to increase the remaining symptoms. It frequently confirms the fear he has, perhaps unacknowledged to himself, that he never will be able to use his eyes and do good mental work again. This fear sets in motion very frequently the chain of symptoms known as traumatic neurosis. The patient should be kept away from too solicitous friends, who, by frequent allusions to his recent accident, tend to keep active a chain of thought which might lead easily to further neuroses. The patient needs repeated assurances that his injured eye is regaining its normal functions. This will do more than any other one thing to restore his confidence.

MILITARY SURGERY OF THE EYE.

Shrapnel Wound of the Occipital Region with Involvement of the Visual Centers. Casey Wood[1] has reported an example of this injury, and remarks that, as is well known, the present style of trench warfare has brought about an unusual proportion of injuries to the head. Both British and Continental—especially German—literature confirms and illustrates this fact and in reports from the seat of war one reads references to the large percentage of eye injuries. For example, Elschnig (*Medizinische Klinik*, May 16, page 553, 1915) draws attention to a great variety of ocular injuries among the German soldiers. He encountered a large number of

(1) Ophthal. Rec., August, 1915.

these traumatisms which were easily recognized and where eyesight was saved by proper treatment; but there were many other instances in which the time for effective management had passed before they reached the ophthalmic surgeon and in consequence irreparable lesions and blindness resulted.

As instances of ocular injuries received in actual warfare are not as yet common in this country, the following report may be of interest: J. H. P., aged 21, single, a soldier in the British army was wounded on March 13, 1915, by the explosion of a shrapnel shell. At the time he was struck he was on his knees, stooping forward and assisting another soldier who had been wounded, so that the shrapnel fragments struck him on the back of his head. He felt as if he had been hit with a club but did not suffer any acute pain. He did not become unconscious and when his wound had been dressed by a comrade he was able to walk to a distant part of the trenches whence he was carried the following evening by litter to a dressing station. He was then sent to a base hospital, where (on the third day) the skull was examined and he was told that a depressed fracture had been elevated. At the same time a small and superficial piece of steel was removed from the scalp wound.

He was shortly afterwards removed to England when new symptoms—swelling at the back of the head and neck, rise of temperature—developed. On April 8, 1915, when in the London Hospital, an operation was done to relieve an extensive infection of the scalp and neck, a drainage tube being inserted within the original wound, coming out an inch and a half below the left mastoid process. At this operation an irregular piece of shrapnel shell nearly an inch long and from a third to half an inch in thickness was found and removed, after which the local conditions very greatly improved. An *x*-ray examination showed no additional foreign body at the seat of injury.

While walking about the ward on April 30, he had an attack of vertigo, was obliged to sit on the edge of his bed, felt very "queer" and noticed that his left arm began to jerk and his feet to dance. He grasped his left wrist with his right hand and then lost consciousness.

He was afterward told that he had had a convulsion, with some sort of "left-sided symptoms." He has not had before or since any of these convulsive attacks.

The patient was during this time examined by Arnold Lawson and Grainger Stewart, and discharged after seven weeks, greatly improved.

When seen by Wood on July 9, 1915, he had been in America several days and, although somewhat shaken by the voyage across the Atlantic, seemed to be in good condition. He is a tall, healthy-looking young man, weighing 176 pounds and presenting all the appearances of good health. Temperature and pulse are normal. He has been short-sighted almost all his lifetime, but with correcting lenses obtains central vision of 20/15ths minus and Jaeger one in each eye.

Just behind the vertex in the median line there is a depression in the skull with, apparently, some loss of the underlying bone. This corresponds to a scar about two inches in length almost parallel to the middle line. It begins a little to the left and crosses the median line downward and to the right.

This (recent) cicatrix is not sensitive to the touch. There are also three, smaller, evidently recent scars below the upper insertion of the left sterno-mastoid.

About the only subjective symptoms the patient now complains of are morning frontal headaches and "blurred sight," the latter referred to the left eye. If he overexerts himself in any way, the headache is somewhat increased, but it generally disappears before noon. The head pains entirely disappeared before he left England, but since the ocean voyage to this country they have recurred.

Blood examination by Dr. N. S. Davis, jr., showed erythrocytes 4,800,000, leukocytes 16,900; hemoglobin 85 per cent.

The patient's pupillary reactions, ocular tension, muscle balance and the external appearances of the eye are all normal. On dilating his pupils and scanning the fundi he presents a few white, very small dotted exudates scattered over both fundi, in addition to slight myopic changes. On the right side just above the disc is what appears to be the remains of an old hemorrhage. The

important alterations in the fundi are, however, a definite blurring of the outlines of both nerve-heads, with obscuration of the physiologic cups and loss of transparency in and swelling of the papillary tissues. The retinal vessels, both veins and arteries, are engorged and slightly tortuous. In fact, the picture is that of a recent, though receding, mild, bilateral papillitis. The fields of

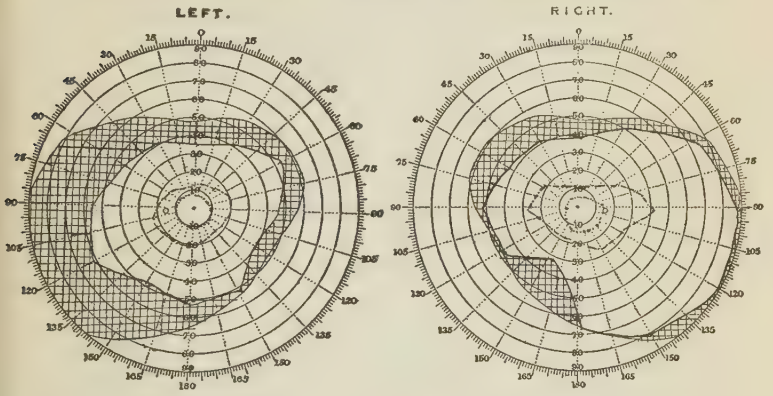


Fig. 10. Perimeter charts in Dr. Casey Wood's case of shrapnel injury to the brain.

vision (two examinations at a week's interval gave almost identical charts) are shown in the accompanying illustrations. The areas, especially on the left side, for white, red and green, are decidedly contracted (Fig. 10.).

The treatment has been entirely hygienic, following the definite instructions of the patient's oculist, Mr. Arnold Lawson, except that frequent very hot fomentations followed by very cold applications to both temples and occular regions, ordered by Wood, appear to give relief to the headaches, which at this date have almost disappeared.

At the author's request, Dr. Archibald Church reported that the functions of the cranial nerves showed nothing abnormal, "aside from the restriction of the fields above mentioned. There is also no evidence of disturbance of innervation in the distribution of the cord and spinal nerves. Reflexes, sensation, trophic conditions, are every-

where normal. The knee-jerks are brisk, but on repeated examinations prove to be equal, as are the deep and superficial reflexes elsewhere.

"Evidently the young man received an injury to the occipital lobes affecting the right cuneus more than the left. Whether this is entirely traumatic in character or in some sense dependent on a secondary infection, I am unable to state. I would suggest that he be carefully watched for rise of temperature, and that his blood be searched for any evidence of leukocytosis."

Whether the damage to the optic nerves will result in further invasion of the fields and go on to optic atrophy remains to be seen. If the eye symptoms are entirely due to the traumatism, as such, the youth and good health of the patient will probably bring about recovery with no additional damage to sight. If, on the other hand, the papillitis results from an infective meningitis the usual results of a post-neuritic atrophy of this character are to be feared.

[As a postscript to the above it may be said that the patient developed a brain abscess, which after operation, entirely healed. There are now few symptoms of the serious injury and the young man is engaged in his daily occupation. A supplementary report will be published of this case.—Ed.]

Eye Wounds in War. Darier[2] remarks that after eight months of fighting, the importance of eye injuries can be realized. At first the lower limbs were most often struck, but in trench warfare the head is more exposed than the rest of the body, and so eye injuries have increased from 5 to 13 per cent. Wounds from bullets, shells and shrapnel are much more numerous than from bayonets and sabers. The worst are the shell injuries, as high-speed bullets sometimes penetrate without much damage. There is no field service in ophthalmic work. All early French cases were sent to Paris, but the writer hopes, when operations become more motile, to have a service of ophthalmic surgeons with the vanguard. He then enumerates the principal injuries thus far observed, amplifying several more interesting ones. In explosions of shells at close range the force of the wind

(2) La Clinique Ophthal., October, 1915.

alone can produce grave lesions, as rupture of the tympanum. The men are thrown down, unconscious, with amblyopia or even amaurosis. Most often the reflexes produce hemorrhage of the retina or vitreous, and the prognosis is grave. Three cases of traumatic cataract were observed.

Extraction of intra-ocular foreign bodies is usually impossible, because the fragments are non-magnetic. In the majority of cases enucleation is performed.

A case of nicotine amblyopia was observed in a captain who had not slept for three nights during the retreat of Charlevoi, and from fatigue and hunger had smoked incessantly.

A surgeon became infected with the pus of a gangrenous abscess while operating, and developed a severe iridocyclitis which, however, responded to energetic therapy.

Many skull fractures, with monolateral or bilateral choked discs, were examined before and after trephining. A case of aphasia and agraphia was cured by trephining on the side of the swollen disc. There was a case of cortical blindness of both eyes following the passage of a bullet through the calcarine fissure.

First aid by the general surgeon should consist of as good asepsis as possible, a soft but firm protective dressing, an injection of morphine and two or three antitetanus serum treatments. The sympathetic ophthalmias, so frequent in war, are not seen during the early days. Then the case can be referred to an oculist at the central service, and when the eye can not be saved, enucleation is the best treatment, and artificial eyes given early. In eight months, Darier has not observed a single case of sympathetic ophthalmia because the above *regime* was followed.

Shell Injuries to the Eye in Warfare. A. W. Ormond[3] describes three cases of traumatic amblyopia following the explosion of shells.

One case of loss of sight of right eye, owing to bullet passing through orbit.

One case is reported of a soldier fighting in the ranks with double buphthalamos, his vision in each eye being 6/60.

(3) Ophthal. Rev., August, 1915.

Twenty-eight cases of soldiers blinded in battle. Ten of these men have no perception of light at all, and the sight of those who have vision ranges from a mere perception of light to the counting of fingers in one part of their field. Twenty-one were the victims of bullet wounds which for the most part traversed the front part of the head from side to side; four were wounded by shrapnel, one by a hand grenade, and the rest by explosion, the exact nature of which the men themselves are unable to give; one, however, was due to a bullet hitting the magazine of the man's own rifle which exploded in his face.

One remarks the extraordinary malignancy of these indirect bullet wounds of the eyes; several of the men when looked at now appear to be absolutely fit, often with both eyes intact and having a natural appearance, and the scar of the entrance and exit wounds are almost impossible to locate. Sir Victor Horsley states that the severity of bullet wounds is proportional to (1) the sectional area of the bullet, (2) its velocity, (3) the amount of fluid present in the medium through which the bullet travels. This last factor, Ormond thinks, accounts for the extreme disorganization of the globe found in many cases in which the eye has not been hit directly at all; the greater part of the vitreous chamber being occupied with soft glistening white masses of organized blood-clot; in part showing also some red coloration and often entirely masking all details of the fundus. In a few cases the optic nerves themselves have been severed, and in others definite rupture of the choroid and the retina can be made out.

Ormond further says:

"Of all the cases of injuries to the eyes that I have seen, including a large number in which one eye only is damaged, I have had only one case in which detachment of the retina was probably present. I have also had only one case of cataract, which is, I think, remarkable, considering the number of cases of injury to the eye both direct and indirect which have been seen. To those of us who are working in base hospitals it is a matter of the greatest regret that we are unable to do anything to improve the vision of these blinded men,

the damage is so extensive and of such a nature that it precludes any hope of improvement. A great deal of work has of course been expended in cleaning up the wounds and curing septic discharges, which in some cases were very profuse, but the main work of the surgeon is now to devise plastic operations to diminish the disfigurement and to enable the men to wear artificial eyes.

"The psychology of these men who have been blinded is very interesting; with only two exceptions, and of these one is probably the result of damage to the frontal lobe, all of them exhibit extraordinary cheerfulness and contentment.

"One case of ulcer of the cornea. Among the cases that have been sent to me from among the men training in and around London, I have seen about half a dozen cases of miner's nystagmus, which had apparently been previously cured but which had redeveloped under the strain of training; these men have all been considered unfit for foreign service. Two cases of retinitis pigmentosa with well-marked pigmentary changes in the fundus have also come to me; these are quite unfit for either home or foreign service.

"I have had only one case of deliberate malingering which was very easily detected, but a large number of men are inclined to exaggerate existing defects and require some reassuring that matters are not so serious as they would like one to believe. On the other hand, it is pleasant to record that many men have given in their ages as anything from 35 to 39 years whom I have found from their inability to see to read, notwithstanding the excellence of their distant vision, to be at least 50 years of age, but whose keenness and fitness make them in every way desirable soldiers."

Traumatic Double Hemianopsia with Partial Recovery. C. E. H. Milner[4] records two cases of this form of injury as follows: The occurrence in both of bullet wounds in the occipital region, immediately followed by complete blindness, and of subsequent recovery of vision except in one direction, which has been identical in both —the left lower quadrant of the visual field. And perhaps the chief interest is a psycho-anatomic one, namely,

(4) Lancet, July 24, 1915.

a consideration of the question why there existed a condition of total blindness and why there has been recovery.

As to the etiology of the condition present in both cases, one of double complete hemianopsia passing into double quadrantic hemianopsia, there are two possible solutions: In both cases there was certainly some actual damage done—*i. e.*, some (probably permanent) injury to the lower part of the cuneus on the mesial surface of the right occipital lobe. Such damage would readily account for the persistent quadrantic hemianopsia. It is for the other condition, that of transient double complete hemianopsia, of temporary total blindness, that there are two possible solutions. On the one hand this may have been caused by hemorrhage at the moment of the wound, by blood effused along the mesial aspect of the occipital lobes, which by pressure caused immediate total blindness, and later became organized into a small clot; or it may be due, as suggested by Major F. W. Mott, to a profound but passing shock effect which made itself felt also in the opposite occipital lobe, and for the time being paralyzed the function of the entire visuo-sensory apparatus.

Night Blindness in the War. F. Best[5] examined thirty-six cases of night blindness that were discovered among the troops at the front, and did not believe that the classification of this disease should be changed to include a special type due to trench activity; but he does acknowledge that hemeralopia plays a rôle that can not be neglected in a war that is waged at night.

He estimated the degree of hemeralopia by the rapidity of dark adaptation and measured this by the "illuminated watch." This is a dial made visible by the radiations of zinc sulphide. In order to estimate the total degree of dark adaptation, the total surface of the dial was used and not the hands alone, which would have measured only the dark adaptation of the fovea.

The thirty-six cases might be divided as follows:

1. Hemeralopia due to disturbances of the liver, following injury by shrapnel. Incomplete and temporary.

(5) Münch. med. Wochenschr., Aug. 17, 1915.

2. Congenital hemeralopia. Discovered incidentally in the trenches.

3. Hemeralopia due to errors of refraction. Two-thirds of all of the cases were of this type.

4. Hysterical hemeralopia. This occurred very seldom.

5. Hemeralopia following sun blinding. Only transitory.

6. Hemeralopia following night service in the trenches.

7. Hemeralopia due to hunger and emaciation, either with or without areas of xerosis. Always disappeared under hygienic treatment.

Only a moderately high degree of night blindness interferes with military service and renders a man unfit for night duty in the trenches. With the exception of Types 2 and 3, in all of the above mentioned cases cures resulted.

Hemianopic Disturbances of the Visual Field After Gunshot Injuries of the Skull, Especially of the Occiput. W. Uhthoff[6] reports his personal experiences of nine cases of injuries in the present war. He estimates the frequency of injuries of the eyes and visual disturbances as 8 per cent. of all war injuries, due to the fighting in trenches where only the head is exposed. About 9 per cent. of all injuries of the visual organ are gunshot injuries of the skull with hemianopic disturbances. In five out of nine cases the hemianopsia was double-sided, and in two of these there was hemianopsia inferior, caused by a transverse direction of the shot immediately above the visual center or through the upper portion of the optic radiation. Both cases corroborated the assumption that the upper lip of the calcarine fissure corresponds to the upper parts of the retina and the lower portions of the visual fields. The occurrence of double-sided hemianopsia inferior by a direct injury is not surprising, while it has hardly ever been observed after thrombotic softening or hemorrhages of the brain, owing to the complete vascular supply of the visual sphere. Occasionally, a certain asymmetry in the intensity of the functional disturbance in the hemianopic visual field was observed,

(6) Klin. Monatsbl. f. Augenheilk., 55, p. 104.

which Uhthoff attributes to exhaustion of the patient during examination. In this form of double-sided hemianopsia central vision was partly preserved, frequently, however, much reduced immediately after the injury for from seven and one-half hours to four weeks, but later on improved. No permanent, complete amaurosis occurred in the writer's cases. The restoration from the disturbances of sight and visual fields in all cases was considerable. The ophthalmoscopic condition was negative in one-half of the cases, but in part there appeared later optic neuritis and papillitis from intracranial complications, usually abscess. The optical memory and sense of orientation, so far as not encroached on by the defects of the visual fields, were well preserved in all but one case.

In one case violent neuralgia of the right occipital nerve, apparently due to retraction of the scar, was observed and cured by injection of alcohol. Permanent pain of the whole side of the head in another case was attributed to a central cause. None of the cases showed ocular palsies.

Hemianopic Disturbances of the Visual Fields After Gunshot Injuries of the Skull. A somewhat similar report to the foregoing is given by Axenfeld[7] of eight cases, four of which were double-sided. One of these was a case of hemianopsia inferior caused by a tangential shot, without perforation of the bone, on the right side of the occiput. It affected both visual centers, either by hemorrhages or splintering of the bone. In four cases the lower halves of the visual fields were defective. Axenfeld also observed asymmetry of the visual fields and attributes it to exhaustion of the patient during examination. Then, at first often complete, amaurosis disappeared in all cases. Papillitis in one case was not caused by cerebral abscess, but he thinks that the traumatism by itself, the effect of the destroyed brain substance and hemorrhages may explain the optic neuritis. If of longer duration, however, the formation of brain abscess may be suspected. One patient with double-sided hemianopsia, after a tangential shot, complained of hallucinations in the defective visual half. From these

(7) Klin. Monatsbl. für Augenheilk., 55, p. 126.

Axenfeld inferred that even in injuries in the immediate neighborhood of the cerebral cortex the defects are not necessarily merely cortical and do not indicate complete destruction of the cortical parts.

Destruction of Cortical Visual Centers by a Rifle Bullet. R. G. Waddy[8] reports a case of a soldier, aged 34, who was shot through the back of the head with a rifle bullet. The bullet entered the left side of the head, 5½ inches posterior to the outer boundary of the orbital margin, on a line 1¼ inches horizontally posterior to the tip of the mastoid process and 3 inches superior to that point, traversed through the back of the head, exciting slightly upward and backward. Upon regaining consciousness after nine days, he was unable to see anything beyond distinguishing light from dark, or coarse hand movements. The pupillary reactions to light were normal, but rather poor to convergence and accommodation. The fundus showed only slight hyperemia of the papillae. The general condition of the patient was excellent. No change in the eye condition occurred during the subsequent four months.

The writer supposes that the angular gyri were injured either by the direct passage of the bullet, by hemorrhage, by compression of fractured bone, or callus formation. Doubtless, the cortex in the neighborhood of the calcarine fissure has also been traversed by the bullet. Although the injury to the parietal bones appears to be solely that associated with a clean-cut bullet wound, there may be more extensive fracturing, particularly of the inner table; therefore, too much reliance must not be placed on this being a case of anopsia solely due to the passage of the bullet through the cerebral tissue.

Psychology of Traumatic Amblyopia Following Explosion of Shells. J. H. Parsons[8] most ably and fully discusses this rather obscure and difficult subject, and observes that ophthalmologists have become familiar recently with cases of amaurosis and amblyopia resulting from the shock of the explosion of shells at the front. In many cases, direct injury of such a nature as to cause

---

(8) Ophthalmoscope, April, 1915.
(8) Lancet, April 3, 1915; abstracted in Annals of Ophthalmology.

definite organic lesion in the eye or visual paths can be eliminated. The history of a typical case is briefly as follows:

A man after more or less prolonged fatigue, induced by marching and exposure in the trenches, is incapacitated by the explosion of a shell in his immediate vicinity. He may be merely knocked down or thrown into the air, and more or less seriously injured or wounded by concussion, shrapnel, bullets, or shell splinters. Consciousness is lost for a variable time, but often not so far as to prevent automatic movements, so that the man may walk in a dazed condition to a dressing station. The mental equilibrium at this stage is much disturbed, and all memory of this phase is usually lost. The most striking feature of the case is that the man is instantaneously struck blind. The blindness may be associated with deafness, loss of smell and loss of taste, but all these are less frequent than the blindness. On examination it is found that there are intense blepharospasm and lachrymation.

The lids are opened with great difficulty and examination of the eyes is almost impossible. The writer is not aware of any record of the condition of the pupils at this stage. In the course of a week or two the blepharospasm diminishes and it becomes possible to examine the fundi. Of course, there may be local injury to the eye, but in uncomplicated cases the eyes are found to be normal. The pupils react to light, though in some cases the reactions are sluggish, and sometimes one pupil differs from the other, being larger, or more sluggish in its reactions. The fundi appear to be absolutely normal. By this time probably some restoration of sight has occurred. Light is perceived and large objects may be distinguished. As improvement occurs the patient manages to grope about, usually with his hands outstretched before him, and it is noteworthy that he does not usually stumble up against objects in his path. As soon as it is possible to take the fields of vision it is found that they are markedly contracted, and that indeed to a degree which seems scarcely consistent with the avoidance of obstacles in walking.

Parsons notes that recovery of vision is slow, but eventually it seems always to be complete. In the later stages he has had cases in which the right eye is more

affected and recovers more slowly than the left. It may recover to the extent of having only a central scotoma, though this may reduce the visual acuity to 6/60 or less. By perseverance and encouragement the patient may be induced to read a few lines of the types, and in some instances the manipulation of weak plus and minus lenses has led to the full 6/6 being read.

There are several suspicious symptoms in many such cases. The eye to recover last is often the shooting eye. Some patients show an obvious disinclination to return to duty. Some candidly admit to being in a "blue funk." In all there has been a complete mental upset, sometimes accompanied by hysteric symptoms—outbursts of weeping, etc., in the early stages. These features render it only too easy to jump to the conclusion that there is often a large element of shamming in the case. It is because there is very grave danger of cruel injustice being done to men who have faced the music and come battered out of the ordeal that Parsons attempts an explanation of the underlying psychology.

In the first place it is necessary to segregate these cases from allied conditions due to organic lesions or to malingering. It is not always easy to eliminate organic lesions of the type which causes so-called retrobulbar neuritis. It is still less easy to eliminate malingering, but as this depends upon a knowledge of the psychology of the individual, it forms a prime object of the following discussion. Since there is no demonstrable organic lesion these cases may be regarded as examples of injuries or wounds of consciousness. This does not imply that there is no neural lesion to account for the psychologic disorder, but merely that it has hitherto escaped observation. Parsons adopts the view of parallelism between physiologic neural processes and psychologic events or changes in consciousness.

The writer says that as regards the type to which the group under consideration belongs, it may be admitted that the disorder of the conscious processes varies with the nature and severity of the injury, and with the organization of the individual's character. Of these the latter is by far the more complex.

He adds that in the case of a soldier under shell fire

the man is usually bodily fatigued, whereby his control is impaired. He has "the fear of death before his eyes" and is in a state of acute excitement, whereby his normal judgment is impaired. These conditions conspire to give his innate instincts ungoverned play. On the other hand, positive self-feeling, aided by suggestion and imitation and the sentiments of patriotism, the honor of the regiment, his own honor and so on, enforce his volitional control. At last, however, the shock comes which strikes him unconscious. It is not to be supposed that he is thereby anesthetized to these emotional storms. It is rather to be conjectured that he is rendered "subconscious," and hence the more a victim of his lower instincts. This view is supported by the emotional behavior of the men in the early stages, and by the fact that many of their actions can be revived by hypnosis.

The unconsciousness in these cases is to be explained physiologically by an abrogation of the functions of the highest level cortical cells. Recovery shows that the cells are not irretrievably damaged, and it is most likely that the block occurs on the afferent paths at the synapses of these cortical cells. Consciousness returns, but there is blindness. So far as objective evidence goes, the lower visual paths are intact and function normally. The optic nerves carry their impulses, at any rate, as far as the pupil reactions are concerned. The condition resembles uremic amaurosis. Parsons has seen it also in children after post-basic meningitis. The block is somewhere above the so-called primary optic centers—external geniculate bodies, optic thalami and superior colliculi. It, too, is probably in the synapses of the cortical cells, in this case the synapses of the fibers of the optic radiations. Sometimes such a block occurs physiologically and it is probably to be explained in the same manner.

Though in the cases under special consideration there can be little doubt that the early loss of vision has a definite neural basis, it must, Parsons thinks, be conceded that in the later stages the neural basis is of that undefined nature which we associate with so-called (functional) conditions. In other words, it is neurotic, but it is not "shamming."

The treatment consists largely in attempting to stimu-

late volitional control of the various emotions by suggestion, active sympathy, etc. As regards therapeutic measures, it should be remembered that fright causes great exhaustion of the suprarenal glands.

GENERAL DISEASES AND OCULAR SYMPTOMS.

Systemic Diseases Affecting the Ocular Tissues. Frank Brawley[1] reports eight cases in which metabolic anomalies played an important rôle in the eye symptoms, and remarks of them that it would seem that we have at our command a very valuable weapon in these studies of metabolism. Unfortunately the internists who have proper laboratory facilities and who are properly trained for this work are few in number as yet, and exist at present chiefly among the specialists. The expense of the laboratory work alone is a large item, and when to this is added the fees of two specialists, the oculist and the internist, it is easily seen that such care is beyond the means of many patients. For these, the well-equipped hospital offers a solution of the problem and incidentally a means for extending our researches along these lines. It is understood, of course, that the examination of these unusual eye cases includes a thorough study of the accessory nasal sinuses, tonsils, teeth, urinary tract, glandular system, etc., in order to exclude all possible sources of toxemia.

It does not seem possible that we shall ever be able to point to a given ocular lesion and state definitely that a certain toxin is the etiologic factor. This would seem to be as impossible as it would to account for the variety of skin areas involved in an eczema, a disease now believed to be chiefly the result of a general toxic process, or to account for the occurrence of a neuritis, or a so-called rheumatism in so many different locations.

He remarks finally: "It is as rational a thing, I believe, to correct faults of metabolism in every individual whether ill or well, as it is periodically to overhaul your automobile, or to see that proper fuel and oil are provided. And certainly in the presence of disease in any part of

(1) Ophthal. Rec., May, 1915.

the body the obvious course is to place that body in the highest state of efficiency and resistance by balancing up the processes of metabolism."

Eye Symptoms in Kaposi's Disease. F. R. Cross[2] gives a description of the skin lesions in this disease, which has been called *Atrophoderma pigmentosum* or *Xeroderma pigmentosum.*

The pigmentation and thinning of the eyelids is associated with a dry and rough conjunctival surface and with shrunken eye lashes. On the lid edges may occur warts, or inflamed papules like styes, which tend to ulcerate. Nodular swellings may grow on the skin surface of the eyelids and toward the caruncle. The ocular conjunctiva is usually hyperemic, from a general congestive fullness of the vessels, or with acutely inflamed patches which often run to the edge of the cornea. Some cases are said to have shown pterygium, but the nodules are probably more frequently allied to phlyeten or pinguecula. The edge of the cornea seems particularly prone to implication—a patch of hyperemia simply, or complicated with swelling and deposition of cells which may absorb again, or may form corneal ulcers, or else lead on to the formation of a neoplasm. The cornea itself becomes hazy from infiltration of its substance, or from swelling of the epithelium. In these cases there is photophobia and blepharospasm. Ectropion is frequently present, and leads to opacity or ulcer of the cornea, but in many of the cases that have been depicted the eyes are open and the light seems to be well borne. The optic nerve and the intra-ocular structures are probably not affected excepting as a late complication of more superficial lesions, and even iritis is probably seldom present unless the cornea has first become very deeply affected.

The writer advocates the repeated removal of the growths and curetting of the ulcers, the application of massage and calomel ointment.

L. W. Dean[3] also describes two cases of the same disease and gives a full account of them, to which the reader is referred.

Metastatic Choroiditis. The usual form of metastasis

(2) Ophthal. Rev., July, 1915.
(3) Ophthalmology, July, 1915.

to the choroid affects one eye only. C. C. Boyle[4] describes such a case following labor. Two weeks after confinement a pelvic abscess developed with septic temperature. The right eye became inflamed, with symptoms of irido-choroiditis. Examination of the blood showed a streptococcus infection. A stock vaccine was given, also a subconjunctival injection of 10 minims of 1-500 sol. cyanide of mercury. The pupillary exudate promptly cleared and the eyeball gradually whitened, but the vitreous remained hazy, the vision was reduced to hand movements and the eyeball was beginning to shrink.

Retinal Angiosclerosis and Associated Lesions. Edward Jackson[5] gives a valuable contribution to this subject. He says that during the last third of a century angiosclerosis has grown definite and valuable. The most important advance was the recognition in the retinal vessels of definite changes visible with the ophthalmoscope. Marcus Gunn was one of the first to describe these appearances and Charles Stedman Bull was another early observer of them. Their observations were so accurate that but little has been added. Gunn compared the color of the hardened arteries to burnished copper wire and Jackson thinks it better than the silver wire comparison. He thinks the tortuousity of arterial twigs would better be classed as a symptom of retinal inflammation or late toxemia. At arterial crossings over veins the latter is hammered by the overlying artery until its wall becomes thickened much as callous is developed in the skin by repeated pressure upon it. He questions whether these venous narrowings are signs of early sclerosis; he finds their presence frequently in normal eyes.

He disagrees with Gunn regarding the importance of distention of the vein to the distal side of its crossing of an artery, and the liability of such distension to cause hemorrhage. He has not found that such localities are subject to hemorrhage.

He thinks Bull in error when he speaks of weakening of the vessel walls being liable to cause aneurysmal dilatations. He has not seen an unquestionable case among

(4) Jour. Ophthal., Otol. and Laryngol., June, 1915.
(5) Ann. Ophthal., July, 1915.

hundreds of cases that showed distinct evidences of arteriosclerosis. Other diseases of the vessel walls occur that are characterized by many aneurysms, as angiomatosis and the vascular disease described by Leber. He agrees with Bull that retinal hemorrhage at an early stage of angiosclerosis is more likely to occur than later.

The brick-red color of the optic disc he has noted many times as an early symptom and regards it as a symptom of importance.

The general importance of this subject, especially the early diagnosis by the ophthalmologist while making an ophthalmoscopic examination during the fitting of glasses is especially to be commended.

The Prognostic Significance of Changes in the Retinal Vessels. Arnold Knapp[6] believes that the presence of sclerotic changes in the retinal vessels presupposes with certainty a similar state in the cerebral arteries, but not the reverse; in general arteriosclerosis, changes in the retinal vessels of moderate degree are frequently present, occur in nearly one-half of the cases and especially in those in which the large cerebral arteries are particularly involved. In some cases of retinal vascular changes no clinical evidences of general sclerosis can be found, but these patients will show general symptoms sooner or later.

He enumerates the well-known physical signs: Increased tortuousness of the arteries, arterial pulse, a progressive peripheric venous pulse, variation in caliber in the blood column, "silver wire" appearance of the arteries, indentation of veins by sclerosed arteries, cockscrew appearance of arterial twigs, congested appearance of the nerve-head, changes in the vessel walls as a result of which they become thickened, opaque and gradually transformed into white lines which sheath the narrow or obliterated blood-current at the same time the lumen becoming narrow or occluded; also hemorrhages, edema and exudates.

Regarding prognostic significance, this writer mentions Geis' results in which in seventeen cases of distinct arteriosclerotic changes in the retinal vessels, death resulted in every instance from apoplexy within four years. Cases with the ophthalmoscopic picture of sudden closure of

(6) Medical Record, May 29, 1915.

the central retinal artery or of a branch are to be regarded as examples of arteriosclerotic retinal disease when they occur in patients over 40 years of age with no evidence of any other cause or of a cardiac lesion. In these cases the ophthalmoscopic picture has the same prognostic significance as in the case of the visible arteriosclerotic retinal changes, though the apoplectic attack may occur somewhat later. Closure of the central retinal artery in young people up to 39 has no prognostic unfavorable significance. Vascular changes in the retina, due to syphilis, have not the same serious general prognostic importance as the corresponding arteriosclerotic changes. As changes in the veins (venous thrombosis) occur much more readily than in the artery, Geis' statistics show that in 50 per cent. venous thrombosis is a purely local change, though in from 40 to 50 per cent. it was the precursor of cerebral vessel sclerosis. Really definite and serious prognostic significance is only given in those cases in which in addition to the lesion in the vein the other retinal vessels showed sclerotic changes.

Retinal hemorrhages, if they are not due to local diseases or to abnormal blood conditions (anemias, etc.) occur when the vessel walls are brittle, especially with the addition of increased blood-pressure as in arteriosclerosis. These vessel changes need not be recognizable with the ophthalmoscope. They have the same prognostic significance that arteriosclerotic changes in the retinal vessels possess, though in Geis' cases the cerebral hemorrhages did not occur for a number of years. A distinction must be made in isolated hemorrhages occurring in the macular region. These seem to be due to local changes and have not the same serious general significance. This also holds good for the retinal hemorrhages occurring in syphilis. It is very important to realize the necessity of estimating the blood-pressure in the presence of retinal hemorrhages. Its increase is a serious sign.

Aside from the usual picture of albuminuric retinitis, we find isolated retinal hemorrhages occurring in nephritis where there are signs of increased blood-pressure, and which are probably due to arteriosclerosis. In this condition cerebral apoplexies are to be expected and

in the cases which Geis was able to follow they always occurred. At the same time, death resulted at a later stage than is usual in albuminuric retinitis. Thrombosis of the veins occurring in cases with albumin in the urine should be differentiated from cases of albuminuric retinitis and isolated retinal hemorrhages occurring in nephritis, as they do not permit of any general prognostic deductions.

The conditions in *diabetic retinitis* are similar. Aside from the typical diabetic retinitis, we find hemorrhages which must be due to pathologic changes in the vessel walls. In these isolated retinal hemorrhages in diabetics the blood-pressure is increased in a large number of cases. A definite prognosis in diabetic retinitis can only be given in those cases of isolated hemorrhages associated with arteriosclerotic vascular changes which are to be regarded as precursors of more serious cerebral mischief. In the usual retinitis of diabetic patients just as in albuminuric retinitis, apoplexies occurred in only from one-third to one-half of the cases.

Finally, Knapp discusses the attacks of obscuration which especially patients with vascular disease of the retinal arteries are subject to; these may be the forerunners of a permanent loss of sight and frequently precede partial or complete blindness. The cause of these obscurations is unknown; it may be a spasm; if so, the prognosis is different as it affects normal and pathologic blood-vessels. Such intermittent closing of healthy retinal arteries may occur without any lasting effect in vision. In diseased retinal vessels this phenomenon is of grave significance.

Acute Retrobulbar Neuritis and Multiple Sclerosis. J. Tarle[7] discusses this subject after an analysis of twenty-nine recent cases. Only acute cases with the typical clinical picture were considered, excluding the more chronic forms and all those due to affections of the orbit and nasal sinuses and intoxications. Two-thirds of the patients were females. The average age of men was 29, of women 27. As causes were stated: over-exertion, slight febrile diseases, disturbances of the nervous sys-

(7) Klin. Monatsbl. f. Augenheilk., 54, p. 412.

tem, loss of blood, and acute infectious diseases. In none was the affection attributed to cold.

The course of the disease in most cases was typical: Vision was suddenly impaired by a more or less dense fog. First, a central scotoma for colors, than a relative and later an absolute central scotoma for white was found, which rapidly spread, leaving remnants of the peripheral visual field or even amaurosis. In twenty-four cases vision was much reduced. The amblyopia lasted from a few days to about four weeks, and disappeared in the way it came. It was noticed, first, that the peripheral portions of the visual field are restored, then the central scotoma grows smaller, finally more or less marked scotomas, absolute or relative, remain or vision becomes normal. This occurred in eleven cases. Good central vision for white and central disturbances of color perception and paracentral scotoma were observed in six; moderate central impairment of vision with scotomas in seven cases. In five ambulant patients the final result could not be ascertained.

Other ocular symptoms were pain in moving the eyes and on pressure, especially at the beginning; pupillary disorders were frequent, inequality of the pupils occurred in eight.

The affection was bilateral in four cases; in one patient a single eye became affected after the other. No palsies were observed, but there was nystagmus in two cases. The ophthalmoscope revealed different conditions; no changes in the beginning in four; in most cases from the start various degrees of deviation in color and contours; in two marked swelling of the disc and intense venous congestion. At the final observation pathologic conditions invariably were found, *i. e.*, different degrees of post-neuritic atrophy, as well as pallor of the temporal half of the disc, from which the cases with restitution of normal vision were not excluded.

Tarle's investigations confirm the importance of acute retrobulbar neuritis as a valuable early symptom of multiple sclerosis. Not only the observation of the further fate of the patients, affected with retrobulbar neuritis, but the careful examination by neurologists of these cases at the beginning of the ocular affection proved that more

than one-third of them, and if those with *propable* diagnosis are included, more than half presented simultaneously other neurologic symptoms, which, with the eye disease, established the diagnosis of multiple sclerosis.

Paresis of Accommodation After Diphtheritic Vulvovaginitis. R. Pape[8] gives the history of a girl, aged 12, who could not see well for the previous two weeks, especially she could not read or write. V. R.=5/15, with +1.00, 5/5; V. L.=5/15; with +1.50, 5/5. Medium-sized print (Nieden 7) could not be read, even at a larger distance, but with R+3 L+3.50 No. 1 could be read at 30 cm. Pupillary reaction was preserved. Pape surmised a post-diphtheritic paralysis of accommodation, but there was no history of diphtheria angina. On further inquiry, however, the father stated that eight weeks ago the girl had an inflammation of the sexual organs with purulent discharge, which, the writer had no doubt, was a diphtheritic vulvovaginitis.

Polycythemia and the Eye. J. Ascher[9] found, as the most striking symptom of polycythemia in the eye, intense and diffuse hyperemia of the conjunctiva of both eyes, especially the palpebral. It has a more livid dark color than the more pinkish red of conjunctivitis and is most intense at the lid borders. From the retrotarsal folds numerous dilated vessels spread into the ocular conjunctiva. It is distinguished from the ordinary conjunctival catarrh by the absence of irritation and secretion. Another symptom is the bluish discoloration of the sclera in consequence of the intense expansion and filling of the choroid with blood abounding in red blood corpuscles. One of the relatively slight subjective ailments of the patients is asthenopia, caused, as Behr found at an autopsy, by the pervasion of the ciliary muscle by choked blood-vessels and subsequent lowered function. Ascher sees another cause of this asthenopia in the thickening of the choroid by from 0.3 to 0.4 mm., which advances the retina with a decrease of refraction of from 1 to 1.5 D.

The ophthalmoscopic picture of the polycythemic fundus is pathognomonic. Fountain-like projection of

(8) Klin. Monatsbl. f. Augenheilk., 53, p. 476.
(9) Klin. Monatsbl. f. Augenheilk., 53, p. 388.

the dark-colored and ectatic central vessels and the appearance of numerous, otherwise invisible, vessels. These crowd the fibers of the disc apart and create the aspect of choked disc of an elevation of from 2 to 3 D. The observation of these symptoms is of the greatest importance in the diagnosis of polycythemia and its therapy at a time when there are still prospects of a cure or at least improvement by venesection and proper diet.

Homonymous Crescentic Scotomas in Association with Ethmoiditis and Tooth-Root Abscess. G. E. de Schweinitz[1] gives the history of a man, aged 45, of good health and habits, who suffered one month previously from pain over the left eye. Following this there was slight blurring of vision. Examination of the field of vision showed homonymous paracentral scotomata and there was some loss of vision in the left eye. The *x*-ray showed several abscesses of the tooth roots and a posterior ethmoiditis. Appropriate treatment, especially of the teeth, was followed by improvement. De Schweinitz is not prepared to locate with exactness the lesion responsible for these scotomata, but regards it as not impossible that they were situated in the left optic tract. They may possibly have represented incomplete ring scotomata. The fundus examination was negative.

Report of a Case of Reflex Ocular Disturbances Due to Impacted Third Molars. An interesting clinical report on this subject is that of Howard V. Dutrow.[2] A man, aged 22, gave a history of having had several attacks of severe headache, followed by vomiting, which relieved his headache temporarily. At this time he had a complete paralysis of the left external rectus muscle. The right eye was elevated and rotated inward, due to the spasmodic contraction of the superior rectus and the superior oblique. The fundi were normal. After the extraction of impacted molars the patient improved generally and within a month muscle balance was entirely normal; the gastric symptoms and the headaches entirely disappeared.

Additional proof of the causative relation between dental diseases and eye symptoms is furnished by A. E.

(1) Ophthal. Rec., April, 1915.
(2) Ophthal. Rec., May, 1915.

Ibershoff,[3] who reports two recent cases (three previously) of ciliary disease due directly to decayed teeth, which was promptly relieved by appropriate and thorough dental work. Each of these patients presented the classical symptoms of web-like vitreous opacities, plastic deposits on Descemet's membrane, diffuse cloudiness with obstruction of the fundus and great loss of vision.

OCULAR RELATIONS OF THE NEIGHBORING SINUSES.

Bilateral Optic Neuritis Due to Sphenoidal Sinuitis. A. A. Bradburne[1] gives an instance of this very rare form of optic neuritis. The patient was a married woman, aged 27, in good health. She consulted the writer in January, 1914. About Christmas she had suffered from a severe cold in the head, accompanied by a copious nasal discharge, but it had cleared up without treatment. Recently vision had become blurred, and there was a tendency to diplopia. Examination revealed a slight weakness of the left externus, the vision in this eye being 5/9. An examination by a rhinologist gave no important data, but the persistent occipital headache was suggestive of sphenoidal sinus suppuration. Tampons of cocaine and adrenalin were applied to the body of the sphenoid, with a view of attempting operation, but the patient became so nervous that the operation was deferred. The following day a profuse discharge of thick yellowish pus occurred, which continued for more than a week, at the end of which time the neuritis slowly subsided and the abducens paresis gradually cleared up.

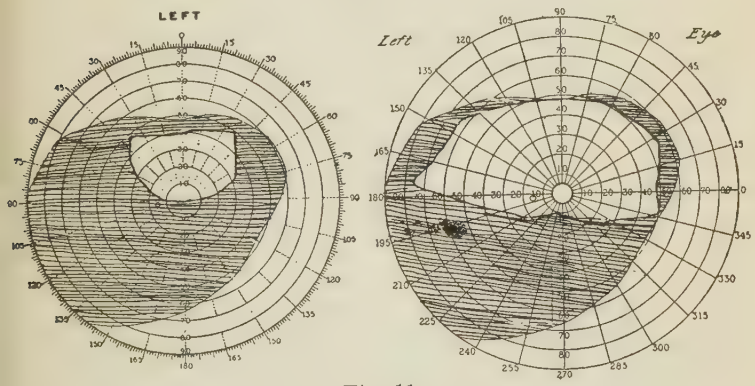
Monocular Blindness Due to Sinus Obstruction. Three cases illustrating the condition mentioned are reported by J. A. Brophy.[2]

Case 1. D., female, age 20, single, occupation secretary, consulted Brophy April 4, 1913, complaining of the loss of vision of the left eye.

She had had diseases of childhood, otherwise had always enjoyed perfect health.

(3) Jour. Ophthal. and Oto-Laryng., July, 1915.
(1) British Med. Jour., Jan. 16, 1915.
(2) Ophthal. Rec., July, 1915.

The night before, when about to retire, she discovered that she was unable to see (with the left eye) the gas light. Her condition was as follows: Pupil responded feebly to light; media were clear; retina—a slight swelling was present which was evidenced by a white line beginning at the outer disc border about its center, and extending to the periphery, disc showed a slight swelling at the upper inner quarter, the line of demarcation being lost, no vascular change noted. Vis. 20/200, being able to see only the upper half of the letter. Field as below, which shows contraction above and on both sides, the lower half being entirely lost. Color sense was in-



April 15, 1913. Fig. 11. CASE 1. July 12, 1913.

tact. The patient was seen with L. Webster Fox. Urine examination was negative. Dr. Skillern was invited in the case to make an examination of the sinuses.

He found the ethmoid and sphenoid cells filled with an exudate, a muco-purulent discharge being present. Following an operation, which consisted of removal of the anterior plate of the sphenoid and ethmoid cells, there was a continued improvement of vision after the third day. On April 21, vision equaled 20/40. The swelling of the upper-inner quadrant was less. No swelling of the retina. On April 27, vision equalled 20/30 and on April 30, 20/20. While the field has improved above, and on both sides, there is still a loss of field below.

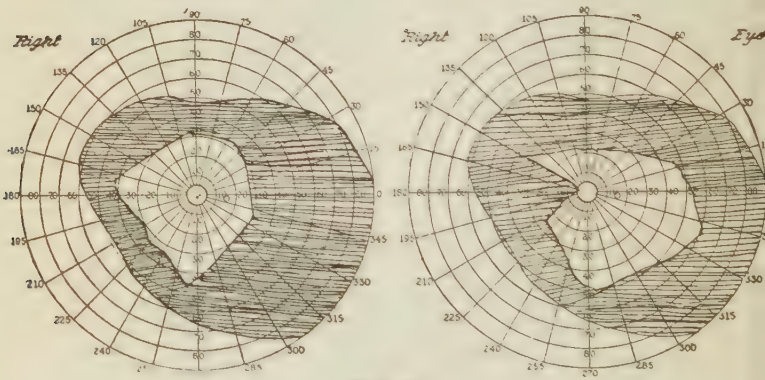
Treatment: Following the operation she was given six electric light baths; three weeks after the operation, a saturated solution of potassium iodide was given, beginning with five drops and increasing up to sixty three times daily. This was kept up for three weeks and as it made no improvement in the field was discontinued.

Electricity, constant current and high-frequency was given for ten days. The patient when last seen several months ago had 20/20 vision and Jaeger 0.50, though field was still lost below.

Case 2. Sept. 13, M. B., age 18, came for treatment of his right eye.

One week previously on arising he discovered that he could not see with his right eye.

He has had diseases of childhood, has had no other illness. The boy is of good size and well nourished. Vision right eye—counts fingers at two feet. L. E. 20/30. Condition of R. E. as follows:—Conj. neg., Cor. neg., pupil responds slowly to light; excursion movement good in all directions; media clear; retina hazy, veins



Sept. 13, 1913. Fig. 12. CASE 2. Oct. 10, 1913.

more engorged, dark, and tortuous; numerous recent hemorrhages showing throughout the field; disc was swollen about five diopters. The field was as shown in the text.

The case was referred to Dr. Skillern who found an

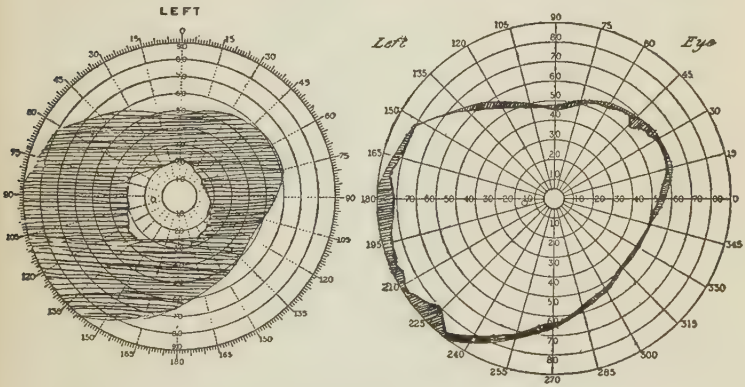
exudate in the ethmoid and sphenoid cells with a mucopurulent discharge. The anterior plate of the sphenoid was removed, establishing drainage. October 10, the optic disc was swollen at the upper, inner, quadrant, elsewhere the line of demarcation being present. Vision 20/40, field shows scotoma.

He was given ten treatments of electricity, high-frequency and constant current, for ten days.

Mixed treatment had been given for four weeks when his visits ceased.

Case 3. Dec. 9, 1913: Miss D., aged 32, occupation housekeeper, complained of marked loss of vision of the left eye, and severe headaches, beginning four months previously. She had had diseases of childhood, no other illness.

Vision, R. E. 20/30. L. E. = fingers at three feet. Condition of left eye as follows: Excursion movement good in all directions; pupil slightly contracted, responding slowly to light; media clear; retina hazy; several



Dec. 24, 1914. Fig. 13. CASE 3. March 15, 1915.

recent and old hemorrhages were scattered over the field; the vessels were engorged, dark and tortuous; disc swollen about four or five diopters; field as below. Urinary test was negative.

Case was referred to G. E. Pfhaler for *x*-ray examination; he reported finding an exudate in the sphenoid

and posterior ethmoidal cells, the middle turbinate being large. While the exudate was present on both sides, it was more marked on the left side.

Following the report of Dr. Pfhaler, the case was referred to E. B. Gleason for examination.

Dr. Gleason concurring in the *x*-ray findings, advised operation which he performed on Dec. 14. He did a complete exenteration of the posterior ethmoidal cells and removal of the anterior plate of the sphenoid.

Following the operation the headache which had been persistent and severe cleared up. The improvement in vision was slow. On April 7, the vision = 20/70. She was placed on five minims of a saturated solution of potassium iodide as larger doses disturbed her digestion.

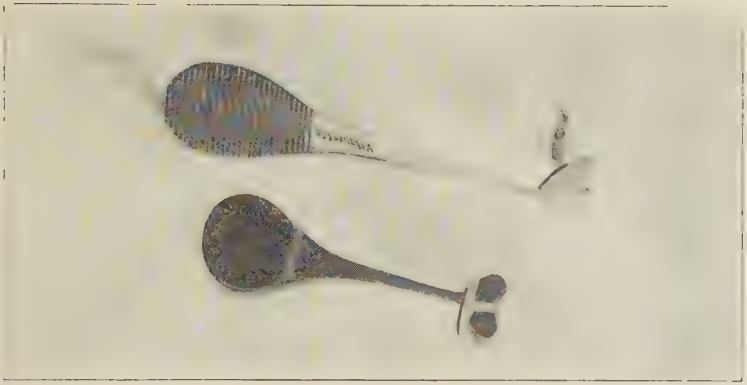
The patient was not seen again until March, 1915; she reported having taken potassium iodide for three months. The eye had steadily improved. Externally there was no deviation from normal in either eye. Eye ground of right eye, media clear, retina too red, disc negative. Left eye, retina was too red, there were several small brownish patches in and up from disc borders. Disc borders slightly woolly.

Toti's Operation for Dacryocystitis. Notes on the so-called dacryocysto-rhinostomy are published by V. L. Raia,[3] based on an experience of twelve cases. Essentially, as is well known, the operation converts the nose and the lachrymal sac into one common cavity, into which the tears and any abnormal secretion may flow freely. To obtain this the bony partition separating the two cavities is removed, and the internal wall of the lachrymal sac, with a corresponding piece of the mucous membrane of the nose, resected. The steps of the operation are in brief as follows:

1. A semi-elliptical incision, reaching the bones underneath, is made with the concavity outward, surrounding the inner corner of the eye, at which level its maximum convexity must be three millimeters in front of the insertion of the inner palpebral ligament.

2. The periosteum is detached from the nasal process of the superior maxillary bone backward to the lachry-

(3) Ann. Ophthal., July, 1915.



Showing new upper and lower lid retractors for control of the eyelids during the cataract operation.—Vail.

Showing the retractors in proper position.—Vail (see page 179).

mal fossa, upward and downward, to the entrance of the nasal canal.

3. The superior maxillary bone with the anterior crista lachrymalis and the lachrymal bone are resected, extending this resection upward and downward as far as the detached periosteum. Chisels of different sizes, straight and curved, and small bone forceps are used for this purpose.

4. The inner or posterior wall of the lachrymal sac, which is recognized by its peculiar slaty color and its continuation with the easily discernible membranous nasal canal, is resected.

5. A piece of mucous membrane of the nose is removed with a sharp knife, of the same size and form as the remaining anterior external wall of the sac by which it must be substituted. This latter, with the opening of the canaliculi, when perfectly united, will constitute a part of the lateral wall of the nose and will be situated in front of the head of the middle turbinate, a region rather spacious in normal conditions and the most favorable for the drainage of the tears and other abnormal secretions.

6. The flap which during the operation has been kept turned outward is replaced and is maintained in its proper position by means of sutures applied in such a way as to include very little of the skin and as much as possible of the deeper tissues.

Simple Intranasal Drainage of the Lachrymal Sac. J. A. Pratt[4] believes that purulent dacryocystitis and closure of the naso-lachrymal duct are best treated by making a direct opening from the internal wall of the sac into the nose. An incision is made into the sac, starting at the upper canaliculus. A dental bur is next introduced and a hole bored into the nasal cavity.

Another operation is described with the object of establishing drainage into the nose in cases in which the sac has been removed. The opening is made with the bur, and a strip of mucous membrane from the lower conjunctival sac is pulled through and anchored to the outside of the nose.

(4) Ophthal. Rec., April, 1915.

NEW OPHTHALMIC INSTRUMENTS.

A New Lid Everter. Sidney Israel,[1] the inventor, says that this small lid everter is the outcome of an endeavor to find an instrument that would give a large exposure of the entire upper lid and cul-de-sac. Its most salient features are simplicity of design, ease of manipulation, and freedom from causing pain in introduction. It has been the means of revealing several cases of trachoma that had been overlooked by ordinary methods.

In introducing the instrument, it is grasped at its distal end between the tips of the thumb and index finger. With the patient looking down, the lashes of the upper lid are held in the tips of the thumb and index finger of the left hand. The knobbed ends of the instru-

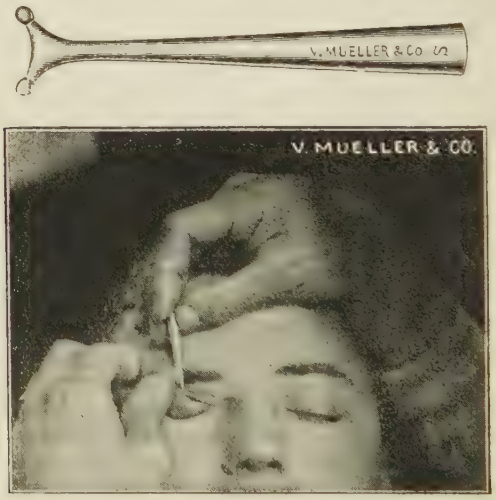


Fig. 14. New lid everter and method of using it.

ment are then placed gently on the upper lid about one-half inch from the ciliary margin with the instrument in the vertical position. With the fingers of the left hand holding the lashes, the lid is retracted over the

(1) Jour. Amer. Med. Ass'n., June 26, 1915.

knobbed ends, and with gentle pressure on the distal end. The entire under surface of the upper lid, including the cul-de-sac, is freely brought into view. In this position the knobbed ends can be slid from the outer to the inner canthus, exposing any part desired. In this position also, with the under surface of the lid exposed, the hold on the eyelashes by the fingers of the left hand can be released, and with the tip of the index finger of the right hand on the distal end still maintaining the position of the instrument in the vertical meridian, the thumb of the right hand can be dropped down to hold the lashes in place to maintain a complete eversion of the lid, while with the left hand free, any foreign body that is present on the under surface of the lid is easily removed.

The instrument can be readily carried in the pocket, and because of facility of introduction, can be used universally by the general practitioner and the ophthalmologist.

Lid Retractors for the Cataract Operation. D. T. Vail[2] has devised this useful instrument which is provided with a heart-shaped guard near the bend of the instrument, designed for the purpose of keeping the lashes from fouling the instruments that are used in the operation. One of the principal advantages in the retractor holding the upper eyelid is that the lid hangs on a single bar, so that there is a gable-like exposure above the eyeball, which gives the operator the greatest possible field. (Plate VII.)

Stumpf[3], has devised lid retractors of heavy glass similar in shape to the Desmarres instrument. They are quite efficient, do not rust, can be used with the electromagnet and are readily cleaned.

New Retractor for Extirpation of the Tear Sac Operation, Exterior Frontal Sinus Operation and Infant Mastoid Operation. D. T. Vail[4] describes this instrument as follows:—"I had it constructed about six years ago, ample time to prove its value. I have used other retractors for these operations and prefer this, as it

(2) Ophthal. Rec., May, 1915.
(3) Münch. med. Wochenschr., No. 23, 1915.
(4) Ophthal. Rec., July, 1915.

possesses many advantages. It is constructed from Allport's mastoid retractor, the working ends of which were removed and these swinging 'hands' substituted.

"After the incision, (which in all these operations mentioned should be made boldly through skin, fascia and periosteum) the periosteum is stripped back a short distance and the 'finger' ends of this retractor are inserted vertically, so that the deepest tissues will be engaged with the arms closed. The 'fingers' dovetail to permit easy application through the smallest incision. The screw is then used to separate the arms and when the bone is well exposed, the instrument is 'broken' at

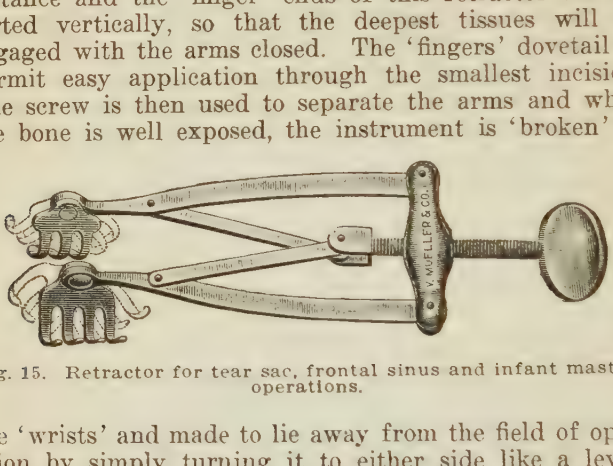


Fig. 15. Retractor for tear sac, frontal sinus and infant mastoid operations.

the 'wrists' and made to lie away from the field of operation by simply turning it to either side like a lever. Bleeding is thus at once controlled and the field is well exposed, dry and ready for the further steps of the operation. It will be seen that this instrument lends itself to facilitate Axenfeld's operation for tear sac extirpation, which I believe consists in making the curvilinear incision on the side of the nose from below the root of the eyebrow half way down the side of the bony bridge with the idea of missing the lachrymal sac. The periosteum is raised on the sac side so that the periosteotome will drop into the lachrymal fossa behind the sac. This retractor is then applied, the belly of the sac grasped in good forceps and the extirpation completed with scissors dissection.

"This operation takes from ten to fifteen minutes' time to complete and may be done with local or general anesthesia. The incision is neatly closed by interrupted sutures, deeply applied, and a wet gauze-ball pad is applied with rather tight bandage to hold the tissues

deep in the cavity in approximation to the bone. The stitches are cut in twenty-four hours and removed in forty-eight hours.

"For the external frontal sinus operation and baby mastoid operation the instrument is used in a similar manner, as the judgment of the operator will naturally decide."

A New Eye Speculum. A. S. Green and L. D. Green,[5] in describing their new eye speculum, refer to the fact that no matter how tractable the patient may be an orbicular spasm is apt to be produced through the operator inadvertently pricking the skin of the lids or of the nose with the knife while making the section; or the patient may forcibly squeeze the lids at some time dur-

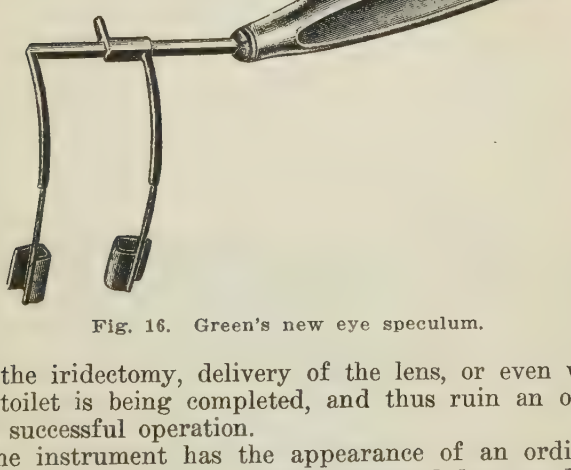


Fig. 16. Green's new eye speculum.

ing the iridectomy, delivery of the lens, or even while the toilet is being completed, and thus ruin an otherwise successful operation.

The instrument has the appearance of an ordinary eye speculum to which a handle, directed downward and outward, has been attached at an obtuse angle. This handle enables the assistant to hold it in position with a firm but comfortable grasp and without tiring his hand.

The two cross-bars which hold the lid-plates are bent at their outer extremities to conform to the curvature of

(5) Ophthal. Rec., February, 1915.

the cheek, and are consequently out of the way and do not interfere with the manipulations of the operator. The lid-plates are attached at a slight angle to prevent the lids from slipping off. The instrument is made in pairs,—a right and a left—one for each eye.

This instrument combines ease of application, proper exposure of the field of operation, and safety from squeezing by the lids. With the tonometer the inventors have repeatedly demonstrated that the intra-ocular tension will not be raised in the least by the most forcible squeezing the patient is able to exert when the instrument is properly held. The lids are at all times entirely under the control of the assistant and the patient is absolutely powerless to cause harm by squeezing. It is introduced at the beginning of the operation and not removed until the toilet is completed and the eye ready to be bandaged.

It is applicable to every form of intra-ocular operation, particularly in the extraction of cataract.

A Spectacle Frame for Tennis Players and Farmers. Having been much annoyed while playing tennis or doing any hard work in hot weather by sweat running down from his eye brows upon his glasses, H. Gifford[6] had a pair of gutters made in aluminum which screw on to the sides of the bridge and the outside posts, which

Fig. 17. Spectacle frame for tennis players and farmers.

prevent this trouble. The inner edge of the gutter fits close under the eye brows and carries any excessive perspiration off to the sides. He thinks that the frame

(6) Ophthal. Rec., February, 1915.

may find a larger application among farmers than among tennis players, as any one who has attempted to pitch hay or do other hard work in the hot sun, will readily appreciate. Many a farmer who ought to wear glasses either for visual purposes or to protect his only remaining eye, will not do so on account of the dimming of the glasses in hot weather. The frames are made by the Omaha Optical Company, Brandis Block, Omaha, Nebr.

Cutting Forceps for Secondary Cataract. A. S. Green and D. L. Green[7] have devised a *cutting forceps* for making an opening in dense, post-operative cataractous membranes. One blade of the forceps is a knife needle, while the other is a grooved and toothed forceps blade. The closed blades are introduced within the anterior chamber with the needle portion down. The

Fig. 18. Knife-needle forceps for secondary cataract.

needle is then pushed through the membrane and the upper blade closed down upon it and with the side to side, and back and forth motion the membrane is gently withdrawn.

OCULAR THERAPEUTICS.

This section may be opened by a reference to a prescription recently discovered by C. E. Daniëls[1] in a Ms. dated 1611, and written by Doctor Abraham van Broecke: "No. 162. For the eyes so that you will not need spectacles. Take a woman's milk, who suckles a son, three spoons; of the same son's piss, four full spoons; the white of a fresh egg and of camphora a scruple. Put these all together in a pot, let it become warm on an oven or fire, put herein some small linen napkins, lay these on the eyes, and let them lay there during the whole night; do this three times every quarter year once."

(7) Ophthal. Rec., May, 1915.
(1) Tydschr. v. Geneesk., June 13, 1914.

[Perhaps some of our own much vaunted mixtures or specifics may one day excite the same sensations in the brains of our descendents that the foregoing now does in ours!—Ed.]

Collosol Argentum. This agent, a clear sherry-colored liquid, is described by the maker, as a solution containing the metal silver in a colloid form. The silver is present in a metallic state, not as a salt. The actual particles are of extreme minuteness, and they pass readily through the pores of a filter, and are visible only under the ultramicroscope. It is claimed for this preparation that no microbe is known that is not killed in laboratory experiments in six minutes. A. Legge Roe[2] considers it "the most useful preparation that has been placed in our hands since the introduction of cocaine." He has used it "many thousands of times," and has never known it to give the slightest irritation. It may be used for months without staining the conjunctiva. He has found it especially useful in purulent ophthalmia, in infected ulcers of the cornea, interstitial keratitis, blepharitis ulcerosa and dacryocystitis. In the various forms of conjunctivitis he has not found it to be so efficient as the ordinary remedies.

The Action of Thorium-X on the Eye. The different parts of the eye are unequally reached by the radiation with thorium, on account of the different effect and absorption of the component rays. The action of the alpha rays in water penetrates only to a depth of 1/10 mm. Consequently they can not enter the eye through the cornea. The beta rays are absorbed two hundred times more effectually than the gramma rays and act on the human tissue to a depth of from 7 to 13 mm.

[G. Abelsdorf[3] attempted to prove this experimentally on rabbits and a very elaborate series of trials was made with various thorium compounds and rays but, the Editor thinks, that results obtained by the use of lower animal eyes alone are, in this instance as in others, not of much value.—Ed.]

Are Cocaine Solutions Injured by Boiling? John E.

(2) British Med. Jour., Jan. 16, 1915.
(3) Klin. Monatsbl. f. Augenheilk., 53, p. 321.

Virden[4] refers to the old belief that solutions of cocaine salts have their anesthetic properties injured by boiling. He made numerous experiments with 4 per cent. solutions, boiling some for three minutes at a time and repeating this a number of times, and other solutions for much longer periods. As a result of numerous experiments of this sort he found that the solutions remained satisfactorily anesthetic, that they produced no undesirable effects such as irritation of the cornea or conjunctiva and that the healing of wounds was not, after using the boiled solutions, interfered with in any way.

The Present Status of Tuberculin Therapy in Ocular Tuberculosis. W. B. Weidler,[5] in discussing this important subject, points out that the idea of tubercle bacilli as the cause of eye diseases is more generally accepted than it was ten or twenty years ago; and that many previously obscure lesions of the retina and the choroid are now comparatively simple to diagnose and treat.

He believes that the most essential factors in the successful treatment of ocular tuberculosis are, first, a slow and gradual increase of the dose extending over weeks and months; careful preparation of the tuberculins; subcutaneous injection rather than intramuscular; and the local and general treatment of the ocular lesion with the same means that were employed before tuberculin was added to our therapeusis.

The results he cites in his paper are based upon an experience with 117 cases of tuberculous affections of the conjunctiva, cornea, sclera, iris, ciliary body, retina and choroid.

His conclusions are:

1. A positive reaction may not be so dependable in suspected ocular lesions of tuberculosis as a positive Wassermann reaction is in suspected ocular lesions of syphilis, but it is at least a strong indication for tuberculin therapy.

2. Tuberculin as a therapeutic measure has an assured place in the domain of ophthalmology.

3. He believes that many failures from tuberculin

(4) Amer. Jour. Surg., August, 1915.
(5) New York State Jour. of Med., September, 1915.

therapy have been due to faulty technique; not continuing the treatment long enough; imperfect and inert tuberculin vaccines; or the use of the wrong tuberculin vaccines.

4. It may be necessary to change our tuberculins when we do not get good results from one kind and use some other form of tuberculin vaccines.

5. The ophthalmologist who is not using tuberculin as a diagnostic agent and as a therapeutic measure is not practicing modern ophthalmology.

Iodine in Diseases of the Eye. Richard Kerry[6] believes that the use of iodine in the form of a 2.5 per cent. solution of iodine in fatty combination is a satisfactory form in which to administer the drug in eye diseases. Ten minims of this is given once or twice a week, according to the severity of the case, with a hypodermic, the flank being the usual site of injection, but this can, of course, be varied.

The main reason for using this method is that it gives better results than are obtainable by ordinary means, and gives them more promptly. In addition it is easily administered, is inexpensive, and can be used in conjunction with nearly all recognized forms of treatment, so that the charge that it interferes in this respect is not well founded. Continued use of the drug for long periods does not cause iodism and is well-borne.

The use of iodine is indicated in that large class of cases in which we are dealing with the distant result of infection, mixed or otherwise, in which there is no recognizable causal focus which can be dealt with, as in some cases of iritis.

Naturally, where any accessible site of septic absorption can be established it should be treated locally. In one case of obstinate recurring corneal ulceration, which was regarded as tuberculous, treatment of the bladder, tubercle bacilli having been demonstrated in the urine, was followed by prompt disappearance of all eye symptoms.

Iodine has been employed principally in severe cases of a phlyctenoid type, many of which are indistinguishable from those which, clinically, are diagnosed as tuber-

(6) Ophthalmology, October, 1915.

culous. The action in these cases is prompt and beneficial, and accompanied by a remarkable diminution in size of the swollen cervical glands generally present. In several instances masses of inflammatory tissue of the size of a fist have resolved, the glands becoming normal in size after a few months' treatment. Most of these patients have been treated as out-patients. A certain number, however, do not make satisfactory progress until removed from their home environment.

Cases of recurring ulceration which are accompanied by ciliary injection, and do not respond well to local treatment, do well when treated constitutionally with iodine, the irritation disappearing promptly and apparently permanently.

In interstitial and deep keratitis, pain and photophobia disappear relatively quickly, and although the rate of absorption in established cases does not seem to be materially accelerated, the formation of dense opacities is largely prevented. One recent case of the first variety, formerly treated with salvarsan, does not seem to have benefited by the treatment, but a supplementary course of salvarsan has caused the disappearance of all acute symptoms, leaving the cornea unusually clear.

In iritis of the ordinary septic type the effect is striking, the severe pain disappearing in practically every case, even when the disease is well established, within the week, and recovery is prompt, usually without the exacerbations which ordinarily are so frequent.

The injection of iodine in scleritis is also satisfactory; barring surgical interference, it is difficult to act directly upon the lesion in these cases, and the use of subconjunctival injections is apt to cause severe pain. Acting through the circulation as it does, iodine is carried into the affected tissue, exerts a powerful curative influence upon the disease and prevents the recurrence which is so characteristic.

Acute Attack of Glaucoma Following Instillation of Holocain and Zinc. H. Gjessing[7] discusses a case of acute glaucoma following at once an instillation of 1 per cent. zinc sulphate, preceded by a local anesthetic (2 per cent. holocain hydrochloride). Gjessing's second patient

(7) Norsk Mag. f. Laegevid., August, 1915.

was a man of 79 subject to acute attacks of glaucoma of the type known as glaucoma with intermittent hemostasis. The tension in the eye had been 53 mm. of mercury. The two cases teach the necessity for instilling a myotic at once after tonometry if the tension is in the neighborhood of 50 mm. Both holocain and zinc cause transient hyperemia in the conjunctiva. Plastinin of Moscow has reported a similar case under holocain alone.

[This alleged action of holocain in causing acute glaucoma is probably a coincidence. Knowing that any local irritant may precipitate a pending attack of glaucoma it is also conceivable that the zinc in the mixture may have had that effect. That 2 per cent. holocain, which causes comparatively little local reaction and is not a mydriatic, should be responsible for a glaucoma is highly improbable.—Ed.]

THE EAR.

ALBERT H. ANDREWS, M.D.

INTRODUCTION.

The past year has yielded a large amount of Otologic literature, although nothing especially new or startling has appeared. In many articles generally accepted facts have been stated with unusual clearness and are thus of value to the busy reader. The editor of the Ear section desires to acknowledge the assistance of Dr. Samuel Salinger in his translations and abstracts of the German articles.

ALBERT H. ANDREWS.

DISEASES OF THE EAR.

Relations of the Ear to General Medicine. The interrelation existing between the ear and general medicine is discussed by C. N. Cox.[1] He states that the close relations between the ear and the upper air passages are so obvious as to justify but a mere allusion to the fact. The Eustachian tube represents the path by which disease spreads by continuity from the nose and pharynx to the ear. Pain in the ears is a symptom commonly observed in various diseased conditions of the pharynx and larynx. For instance, in tonsillar inflammation or, more particularly, peritonsillar inflammation (quinsy), pain referred to the ear is almost always present to a distressing degree. But an examination of the tympanic membrane rarely reveals any inflammatory disturbance of the tympanum. The pain is neuralgic, due to nerve pressure about the pharyngeal end of the Eustachian tubes. Malignant disease of the tonsils likewise gives rise to aural pain. So, also, does malignant disease of the larynx. A very common source of otalgia is tuberculosis of the larynx.

The explanation of these reflex or referred pains lies in the fact that the larynx and pharynx are supplied with sensory nerves which are branches of the vagus, and the external auditory meatus receives sensory fibers from the same trunk through the auricular branch. This reflex action is often reversed as, for instance, when a speculum is introduced, a fit of coughing will frequently be produced; and, furthermore, certain sensitive areas in the meatus are occasionally the source of a constant and intractable cough—a so-called ear cough.

Tinnitus aurium is a frequent symptom of disease of the heart and blood-vessels, and of anemia or hyperemia of the vascular system within the ear. The noises caused

(1) Long Island Med. Jour., March, 1915.

by heart disease and aneurysm are usually described as intermittent or buzzing or coughing in character.

Vertigo and tinnitus are frequently complained of by patients suffering from arteriosclerosis; and these are symptoms not to be lightly regarded or loosely attributed to ear disease alone. The aural effects of cardiovascular disease are due, in the main, to blood-pressure changes within the labyrinth.

Functional disturbances in the organ of hearing produced by disease in the central nervous system are either loss of hearing or of the equilibrium, depending on the paths of involvement—whether they be the cochlear or vestibular nerves. When the trunk of the auditory nerve is diseased, both hearing and equilibrium are affected.

The importance of aural suppuration in the production of such intracranial diseases as meningitis, brain abscess and sinus thrombrosis can not be exaggerated. Most cases of meningitis, extradural abscess and cerebral sinus disease are the results of suppurative processes within the middle ear. And a very large proportion of brain abscesses are due to the same cause.

Neurasthenia and nerve-tire are factors of importance in the management of patients whose hearing is impaired. The hearing power is always diminished when the nerve forces are exhausted or overworked. And, so on the other hand, "the fatigue of deafness," to which attention has been called by Blake, may become a very important factor in the cause and persistence of neurasthenia. The everlasting strain of trying to hear with a badly impaired auditory function is such as is not easily appreciated by those who have perfect ears.

Dizziness, often complained of in so-called biliousness or other disorders of the digestive tract, is due to toxic effects on the semicircular canals of the internal ear. There is one part of the digestive system between which and the ear there is an undoubted nervous connection—the teeth. It is a matter of common knowledge that a carious tooth will produce severe earache. The otalgia is frequently so predominant in its severity as to induce the patient to seek relief from the otologist, thinking that the primary trouble is in the ear. In fact, in many instances, he is not even aware that he has dental disease.

The connection between pregnancy and the puerperium and chronic catarrh of the middle ear is so generally recognized among the laity that it is given as the cause of deafness in an abnormally large number of cases, but we generally find it possible to demonstrate objective alterations in the ear which can not possibly be referred to that physiologic condition of the female organism. These auditory disturbances are more likely due to labyrinthine involvement and are no doubt caused by the disturbances in the circulation to which the female organism is subject during the time of menstruation and pregnancy, and to the anemic conditions which follow the puerperal period.

It is generally held that scarlet fever plays a more important rôle in the etiology of diseases of the ear than does any other disease. The two next in order are influenza and measles. The most common aural affection attendant upon scarlet fever is middle-ear suppuration. From 12 to 15 per cent. of all cases of purulent otitis media are secondary to scarlet fever; and when we take into consideration the complications and sequelae of aural suppuration accompanying scarlet fever, there is ample justification for a considerable amount of attention to the ear during the progress of the disease.

The suppuration begins at a late stage of the disease—during the period of desquamation; and is characterized by a rapid and destructive process, which fairly melts away a large portion of the tympanic membrane, and frequently involves the ossicles as well as the bony wall of the tympanum. The mastoid is very often involved. And when this takes place there is the same rapid breaking down and extensive bone destruction. An early and complete operation on the mastoid in these cases is advisable for two reasons: (1) it offers a fair prospect of bringing about an early cessation of the discharge, which otherwise has a great tendency to become chronic; (2) with the cessation of the discharge a source of possible infection and danger to other individuals is removed which otherwise is a potentiality for a considerable but indefinite length of time even after desquamation has come to an end.

It is a matter of common observation that epidemic

influenza is attended with very frequent invasions of the middle ear. The middle-ear inflammation is an extension from the nasopharynx through the Eustachian tube. It is extremely rapid and violent in its course, and the mastoid is frequently implicated. The infective process is characterized by a tendency to force itself everywhere and through everything. Thus it is that we have, in aural suppuration accompanying this disease, not only frequent involvement of the mastoid but a large proportion of intracranial complications. The discharge through the perforated drum-head is bloody for a day or so, then serosanguineous, and eventually purulent. Gradenigo mentions difficult hearing after influenza, which he ascribes to neuritis of the auditory nerve.

The occasional involvement of the internal ear in mumps is as little understood as the more common complications—orchitis, epididymitis and mastitis. The aural complication usually takes the form of labyrinthine deafness, along with other symptoms of Ménière's complex. The deafness is not amenable to treatment, but the tinnitus and disturbances of equilibrium gradually subside. If the disease be bilateral and occurs in early infancy, it is followed by deaf-mutism. Mumps is assigned as the cause of deaf-mutism in 0.5 per cent. of the cases according to American statistics.

The ear frequently becomes involved in typhoid fever. Suppuration is often unobserved, on account of the somnolent state of the patient. The mastoid is prone to involvement at the very outset of the purulent process in the tympanum. It is questionable whether aural suppuration is always due to extension from the nasopharynx by the passage of septic material through the Eustachian tube, although the dry, bleeding, inflamed condition of the nose and nasopharynx is a matter of common observation; and is probably the most usual etiologic factor. Deafness, so often manifested in typhoid fever, with little or no apparent changes in the organ of hearing, is usually due to somnolence; and the condition improves as fever subsides.

Tubercle bacilli may find their way into the middle ear through the Eustachian tube, through the lymph channels, or the blood currents. The existence of pri-

mary tuberculosis of the ear is rather doubtful. Secondary infection of the middle ear, however, does occur with considerable frequency in patients suffering from pulmonary or general tuberculosis. It is characterized by a rapid development of caries, destroying the ossicles and walls of the middle ear, with occasional involvement of the labyrinth, sometimes even extending to the walls of the carotid and jugular.

Of course, ordinary non-tuberculous suppuration is frequently present in the ears of tuberculous patients. And it is by no means to be inferred that a purulent inflammation in the middle ear of a tuberculous individual is of the same nature as that of the general infection. A significant diagnostic point of tuberculous otitis is the painless course of the disease. Whereas most cases of middle-ear inflammation have an initial, painful period of the most agonizing character, until relieved by spontaneous or artificial perforation of the drum-head, a profuse discharge and deafness are about the first manifestations of aural tuberculosis. The presence of tubercle bacilli in the discharge renders the diagnosis positive; but, unfortunately, they are not always easy to find.

Another diagnostic point is multiple perforation of the tympanic membrane. Gruber called it the "sieve-like drum." The only other disease in which the sieve-like perforations occur is diphtheria, in which disease the general clinical picture is entirely different.

Chronic Deafness. In discussing chronic deafness and its treatment, Harold Walker[2] refers to the thousands of people who are gradually and insidiously becoming deaf; whose efficiency is lessened proportionately as the hearing lessens and, most serious of all, whose mental activity becomes diminished, owing to the elimination of the sound of the human voice and the loss of human intercourse. A man must hear to live.

The great number of persons afflicted with deafness, especially in young and middle life, brings up the subject of the economic loss due to lessened efficiency. Holt, in an article on physical economics read before the American Otological Society, by a mathematical formula finds that the adjustment for damages for the total loss

(2) Jour. Amer. Med. Ass'n., Aug. 21, 1915.

of hearing of one ear, in a man 46 years old, receiving $2 a day, is about $1,700. The question of the value of the sense of hearing is an important one, and is not mentioned in the usual accident insurance policies. One may be compensated for injuries, if such injury happens to be included in the schedule of indemnities, but loss of hearing in one or both ears is apparently considered unimportant.

Our modern life is one of ceaseless activity; strain on the nervous system is constant, and the organs of special sense, the eye and ear, are overworked. The eye receives immediate attention at the first suggestion of trouble, but the ear, on the contrary, does its work as best it may, and not until the accidental discovery that the tick of the watch or the family clock can not be heard, or a tinnitus occurs, does the owner trouble to investigate. It is true we possess more hearing than we need in our present life. In colonial days we depended on acute hearing to enable us to hunt the deer and discover the prowling Indian; but now all that seems necessary is to be able to hear the telephone bell, and the satanic blast of the motor horn. Even the "movies" have eliminated the necessity of the spoken word on the stage. Lowered standards of hearing due to nervous fatigue and the noise of the city present a serious problem. Wittmaack and Siebenmann found by experiment that constant noise for a given length of time causes atrophy of that portion of the organ of Corti, corresponding to the location of the tone perception.

We know that the ordinary form of deafness is due to congestion, and from this condition an entire train of symptoms results. The thickened mucosa interferes with the free transmission of sound waves through the middle ear. Closure of the Eustachian tube causes a disturbance of labyrinthine equilibrium and interference with the accommodation for lower tones. If this condition becomes more or less permanent, a chronic spasm of the tensor tympani muscle follows. The result is one which might be expected, namely, the formation of fibrous tissue, which is the last stage of all recurrent or constant congestions, whether the conditions exist in the liver, kidney or middle ear. This is the condition commonly

known as chronic catarrh of the middle ear. A great many terms have been applied to the various stages, from the serious condition following a simple head cold to the adhesive type of the most advanced form. It is one and the same thing; an insidious and certain change. The future maintenance of our standard of hearing depends on the education of the public to the realization that good hearing is as important as good sight. Our duty, therefore, is to prevent deafness in the coming generation, and to alleviate the afflicted by general and local measures.

One of the most important predisposing factors in early life is the belief that a child can not live too much in the open. In our strenuous climate of the east much harm results from the modern method of putting babies and small children out of doors to sleep, in all kinds of weather. If, for past generations, we were accustomed to live in the open for the entire twenty-four hours, no harm would follow, but sleeping in the damp cold winds of the winter and spending the waking period in a room generally overheated, establishes conditions most favorable for trouble in the future. The child often lies on its back, with its head low; a position which favors mouth breathing, congestion of the turbinates, development of adenoid tissue and infection of the Eustachian tube by gravity.

Holt has often noticed in a certain hospital where children are obliged to remain in the recumbent position because of orthopedic apparatus, that the number of aural affections in very large, unquestionably due to the unnatural position.

As soon as possible the child should be examined by a competent aurist, and any obstructions to free normal breathing eliminated. This applies especially to removal of adenoid tissue and is of the greatest importance when it is necessary to correct uneven teeth. Operations on spurs and deviations of the septum should be postponed if possible, until the nose has become more fully developed. The results of the examination of 1,000 schoolchildren, made about ten years ago, were most instructive. In practically every case, the relation between physical condition and mental efficiency was remarkable.

Children with defective respiration, and nasopharyngeal obstruction, suffered from diminished hearing, and showed a corresponding low degree of scholarship. On this examination was based the Massachusetts state law providing for annual tests of hearing as well as eyesight.

In treatment of the adult deaf, it is necessary to recognize the mentally depressed condition of the average patient, and to encourage him as much as possible, at the same time telling him facts. The usual chronic form of deafness can not be cured, and afflicted persons should be told so in a tactful manner. They should be encouraged to go among their fellow men and to use their ears. The tendency of the deaf person is to hibernate, to consider himself a nuisance to his friends. This worry only makes a bad matter worse. Inasmuch as congestion plays the important rôle in the cause of deafness one should first attempt to remove such condition. Constipation is the rule, and is generally marked. The effect on the congestion of the turbinates and nasopharynx is well-recognized. It is likely that the absorption of toxins also affects the cochlea and auditory nerve. Motoring has become so general that a "motor ear" is of common occurrence. This condition is caused by the abnormal speed through the air, and from the irritation of dust. The old-fashioned idea of putting cotton in the external meatus is a good one. It prevents cooling of the warm air in the external meatus and thus wards off neuralgia. The use of a simple oil in the nose before going out, and a plain saline wash, after returning is good.

Ill effects from sleeping in the open in all kinds of weather are as marked in the adult as in the child. Persons who at night have the extreme fresh-air habit, often are obliged to spend their days in close offices, or in badly ventilated, and overheated rooms; they wonder why the nose is usually closed and breathing difficult. When one sleeps the circulation is at its lowest ebb. The body is recumbent, and during respiration the nasal mucous membrane and the turbinal tissue hypertrophy in order to warm the abnormally cold damp air. After a time the swelling becomes permanent, and a chronic passive congestion and a hypertrophic rhinitis result. We should have plenty of fresh air, but it is not neces-

sary to sleep in a wind to get it. The head should be protected from drafts and a pillow used. Our forefathers used pillows, and high ones too, it is to be remembered that they had fine figures and flat backs.

Another cause of congestion to be overcome is the use of tobacco. There is no question that it is a great factor in the decrease of hearing, not from the absorption of toxic agents alone, but from the local irritation of the heat and volatile substances in the smoke. Alcohol, too, should be eliminated. It is, of course, difficult to persuade the average man to give up the habits of years, but the fact should be explained to him fully, and he must take his choice. Diet and exercise should be prescribed just as carefully as though a heart or a kidney were involved. The occupation of the patient should receive attention, whether his environment can be improved and predisposing factors to deafness overcome.

In the local treatment the attempt should be made to deplete the mucous membrane of the nose and pharynx, to remove points of contact in the nose and to cure absolutely any and all accessory sinus disease.

Acoustic Trauma and Protection Against Occupational Deafness. Haberman[3] finds that in coppersmiths and boilermakers degeneration of the organ of hearing takes place in the following order. First the Corti hair cells then the supporting cells undergo degeneration, then the rods become shorter and, finally, the whole Corti organ is flattened out and consists of a layer of flat epithelial cells. In more advanced cases, the nerve fibers themselves are degenerated as well as the spiral ganglia and finally the nerve trunk of the acoustic. By animal experimentation he discovered that only the tones that reach the inner ear through the oval window lead to the degeneration referred to above; in cases in which the ossicular chain was broken the affected ear did not show the degeneration of the labyrinth that was the result on the other side from the same amount of irritation. He therefore concludes that air conduction being so much more destructive than bone conduction one may protect himself against injury from excessive sound vibration

(3) Cor.-Bl. f. schweiz. Aertze, Mar. 27, 1915.

by tightly closing the external canal with an air-free stopper such as a moist pledget of cotton.

Acoustic Trauma. Meyer Gotteberg[4] reports cases of injury to the ear due to detonation of high explosives. Of 105 individuals examined, seventy were affected in the drum and labyrinth, in ten the drum alone, and in twenty-five only the inner ear. Most of the injuries were due to high explosives (ninety-one), a few to shrapnel (ten) and hand grenades (four).

Rupture of drum: The subjective symptoms were severe roaring in the head, sensation of detonation, and pain. If followed by another detonation the patient became unconscious. The after-effects were deafness and subjective noises. Early examination showed typical findings—perforation usually in the anterior inferior quadrant, margins sharp angular or linear, usually bloody, and often showing the pale tympanic mucosa. Sometimes there were multiple perforations especially in the cases in which there had previously been atrophy of the drum. Ten such patients showed large defects one drum being entirely destroyed, the handle of the malleus standing out bare. Hearing was impaired, bone conduction increased, and perception for lower tones lost. The prognosis in simple ruptures without any complicating suppuration was good. The patients recovered quickly. Occasionally the perforation remained permanent. In all cases the typical features of the trauma disappeared within a few days.

Acoustic trauma: This was of two kinds, that due to the constant artillary din and that due to a sudden loud detonation or a succession of explosions, the former leading to a degeneration of Corti's organ, the latter to a tear of the basilar membrane or a hemorrhage. However, in view of recent experiments which show that damage comes to the inner ear through air conduction which can be mitigated by stopping up the external meatus, he concludes that his cases were really a neuritis, a detonation neuritis as shown in 95 of his 115 cases. The symptoms were as in drum ruptures. Further, the noises were high-pitched, there was marked vertigo, shortened bone conduction, poor perception for high tones, and

(4) Archiv. f. Ohrenh., August, 1915.

psychic depression. Deafness was marked but not total. Prognosis was unfavorable.

Facial Paresis Following Disease of Auricle. In one case of othematoma reported by Koerner,[5] there developed a facial paresis affecting all facial branches and the chorda tympani which disappeared in seventeen days. Another case was a perichondritis of the auricle due to the *Bacillus pyocyaneus* which was followed by facial paresis affecting all branches. The writer believes that these cases can be explained as being due to a local toxemia affecting the nerves in the immediate vicinity of the lesion.

Infection of Ear With Vincent's Microörganism. J. A. Mulholland[6] has seen sixteen cases of infection of the ear with Vincent's microörganisms.

Of these sixteen cases, thirteen were confined to the middle ear and three patients had mastoiditis; two of the latter cases were considered inoperable and the patients died from meningitis; both had complete facial paralysis. One patient was operated upon and recovered. The two fatal cases were autopsied. On autopsy it was found that the whole middle ear and mastoid process were necrosed, nature having performed a complete radical operation. The lateral sinus and the dura of the middle fossa were extensively exposed.

It is worthy of note that these cases began insidiously, without rise of temperature or complaint of pain, attention being called to the condition by the presence of discharge at the meatus. The history in most instances was that of a chronic running ear lasting several months or years; diseased teeth, gums and tonsils were usually present, and the general physical condition of the children below *par*. On examination there was usually marked excoriation of the external auditory meatus and a profuse discharge of thick greenish pus having a foul and characteristic odor. The walls of the canal were covered with a dirty grayish membrane which, when removed, left a bleeding surface. The appearance of the drum membrane varied with the intensity of the inflammation and the stage of the disease. Perforations varied

(5) Zeitschr. f. Ohrenh., vol. 72, No. 5.
(6) Ann. Otol. Rhinol. and Laryngol., September, 1915.

in size from that of a pin point to complete destruction, and in the severe cases the probe demonstrated bare bone in the middle ear and attic.

The mastoid cases showed considerable swelling and edema about the auricle, resembling, but being rather more intense, that usually seen in subperiosteal abscess. On opening the mastoid the cortex was found to have almost completely disappeared, and the underlying cavity was filled with a spongy putrid mass, containing some small sequestra of bone. The internal table was also absorbed, exposing the dura and in the fatal cases the skin and subcutaneous tissue had become gangrenous.

Pathologic-Anatomic Characteristics of the Ear in Rachitis. Sections were made by Komendantow[7] of temporal bones of thirty-five rachitic children, aged from 5½ months to 4 years and one 15-year-old, and compared with similar sections from seventy-five non-rachitics, sixteen syphilitics, and ten non-rachitic adults.

The findings were as follows:

1. Beneath the periosteum and mucosa of all parts of the bone, including the ossicles and promontory there were rich deposits of bony tissue often encroaching on the windows and in cases of recovery leaving the bone denser than normal.

2. The lymphoid bone marrow of children's bones was replaced by numerous blood-vessels bound in a mass of loose connective tissue.

3. The mucosa and periosteum were thickened and more vascular than normal.

4. There were islands of cartilage in the labyrinthine capsule and throughout the petrous bone.

5. Marrow spaces persisted around the labyrinthine capsule.

6. There was dehiscence of bone between the tympanic cavity and the jugular fossa, brain, or carotid canal, bone being replaced by connective tissue, thus offering easy infection routes later should otitis media develop.

7. There were large amounts of myxomatous tissue in the tympanic cavity which later result in formation of strands of connective tissue and recesses which would

(7) Archiv. f. Ohrenh., vol. 98.

prevent free egress of pus in case of suppuration, or may cause ankylosis of the stapes.

There seemed to be a similarity in the pathology of rachitic ears and otosclerosis, but no resemblance to syphilitic findings. It is possible that a rachitic ear may under unfavorable circumstances later take on all the characteristics of a real otosclerosis.

Healed Case of Acoustic Tumor: Reactions Following. Barany[8] reports the case of a patient operated on by Eiselsberg in 1909 for an acoustic tumor on the right side, with recovery. While during 1910 the patient was able to use the right hand, since 1914 he has lost that power and therefore has trained himself to use the left hand and has acquired sufficient skill in painting pictures to earn a livelihood that way.

The interesting features of this case are the changes in the pointing reactions. At present there is a constant spontaneous pointing of the right arm outward and also upward that formerly did not exist. The reaction inward is absent. The left arm points correctly and responds correctly to the turning and caloric tests. The patient practiced pointing the right arm with the eyes open and then trying it with closed eyes, the result being correct pointing, and on turning the head to the left a pointing to the left tantamount to a reaction in that direction. This pseudo-reaction Barany explains as follows: The "left" center of the right cerebellum is in this patient destroyed. The "right" center is the seat of a decided rest tonus. When the patient practices with eyes open the cerebral innervation brings about a correct pointing. This happens because the cerebrum overcomes the cerebellar rest tonus to the right by an equally strong innervation in the opposite direction, or it simply inhibits the rest tonus of the "right" center of the cerebellum. This throws light on the subject of cerebellar wounds in animal experimentation; and also on the disappearance of spontaneous nystagmus following vestibular destruction. The influence of the cerebrum on the cerebellum leads one to believe that there is a similar inhibitory influence arising out of the cerebrum on the

(8) Wien. med. Wochenschr., Jan. 30, 1915.

supranuclear centers of the eye muscles as well as on Deiter's nucleus.

MIDDLE EAR.

Development of Temporal Bone in Relation to Endocranial Complications. Blood-vessels which are found in abundance, and are necessary to a certain development period, may persist beyond that period in widespread distribution in the same way that hyperplastic mucosa results from excessive embryo-myxomatous tissue. As a result, says Wittmaack,[9] these vessels may connect the tympanic mucosa with the periosteum of the underlying bone and the dura and thus act as infection routes in cases of endocranial complications where direct infection by contiguity is excluded. The chief routes are the tegmen separating the tympanum from the brain anterior to the convexity of the superior semicircular canal, the posterior surface of the pyramid, and the floor of the tympanic cavity. According to the route the complication developed may be meningitis, brain abscess, and sinus thrombosis respectively. The prognosis in these cases is bad because they show no pronounced middle-ear symptoms that might indicate operation until the endocranial complication is already developed, so that the prophylactic mastoid operation which might have prevented the latter is never undertaken early enough.

Respiratory Drum Movement. A case was demonstrated by Herzfeld[1] in which the patient complained of roaring and crackling noises in the ear synchronous with spiration the drum was retracted and on expiration it respiration. On examination, it was found that on inwas bulged. Lucae reports a similar case with reversed conditions. The author assigns the following reasons for these drum movements: (1) a widely patent Eustachian tube; (2) an atrophic drum; and (3) air current striking the ostium tubae at a particular point. The latter point was significant in that by shrinking the inferior turbinate thus affecting the direction of the air current

(9) Archiv. f. Ohrenh., vol 97, No. 1.
(1) Archiv. f. Ohrenh., August, 1915.

the drum movements in this case ceased. In the above cases a cure was effected by cauterization of the inferior turbinates.

Radium in External and Middle Ear Disease. In six cases of chronic eczema of many years duration, reported by V. Urbantschitsch[2] the pruritus was generally relieved.

The patients with deafness and subjective noises were mostly those who had a large perforation of the drum and in whom the radium carrier could be introduced directly into the middle-ear cavity in the neighborhood of the oval window, and a few cases of middle-ear catarrh in which the radium was placed against an intact drum. Five showed no improvement, five were only slight improvement, and two showed marked benefit. Of six patients with tinnitus three were favorably influenced. Two patients with vertigo were both almost entirely cured. A remarkable case was that of a patient who suffered from persistent singing in the ears, noises, and melodious sounds; after the first treatment the singing disappeared, after the sixth the melodious sounds vanished, but the noises persisted despite further treatment. The author attributes the prompt action in certain cases to the radium emanations. He found no deleterious effects on the labyrinth or central nervous system.

The Eustachian Tube and the Middle Ear. C. F. Coulter and C. H. Pierce[3] have conducted a series of investigations in an effort to determine the relation of the Eustachian tube to diseases of the middle ear, especially in reference to the bacteria of the tube. They have devised a method of examining the tube which is of interest.

The instruments required are two Politzer catheters (silver), sterilized and the distal end sealed with collodion film; and two fiber (Weber-Liel) Eustachian catheters, which are sterilized by boiling, after which they, too, are sealed at the distal end with collodion; and two Yankauer Eustachian applicators.

The two latter instruments are marked, and the exact distance to the neck of the isthmus tabulated on the fiber

(2) Monats. f. Ohrenh., vol. 48.
(3) Journal-Lancet, April 1, 1915.

catheter and the measurements beyond are carefully marked on the silver catheter. The three are loaded as follows: The silver Eustachian catheter is first carefully put in position in the mouth of the Eustachian tube, the operator checking up the position of the beak with an electric Holmes nasopharyngoscope passed through the other nasal opening. When the operator is thoroughly convinced that the catheter is in place, the fiber catheter is carefully introduced through it, and pushed in until the measurements show that the neck of the isthmus has been reached. In pushing the fiber catheter through the mouth of the silver catheter, the film of collodion is displaced like a trap-door, as one side always remains fastened. The sterile Yankauer applicator is next introduced, and the same technique of insertion is maintained, as in the case of the fiber catheter, the external measurements showing the operator exactly where he is in the tube. In withdrawing the instruments the technique is reversed, the applicator first being withdrawn to a point within the silver catheter, checked as before described; and the two former are completely withdrawn from the silver catheter, and the cultures made in the well-known manner with the technique common to all laboratories.

The cultures have been made on both nutrient and plain agar and incubated at 37° C. They were examined at intervals of once in 12 hours for 72 hours, and kept for at least 120 hours.

From these experiments the authors have drawn the following conclusions:

"1. We have found the Eustachian tube sterile in all cases (5) of catarrhal otitis examined.

"2. We have found the Eustachian tube sterile in two cases of suppuration in the middle ear.

"3. We have found the middle-ear cavity sterile in seven cadavers, the patient having died from other causes than ear complications.

"4. This report tends to show that the contention of certain authors, namely, that the middle-ear suppurations are caused, or their continuance is favored, by infections received through the agency of the tube, is false."

The Conservation of the Ears. C. G. Crane,[4] discusses the inflammations involving the middle ear and Eustachian tube in connection with conservation of the ears.

In both acute and chronic inflammation we may have one or all of the three types or stages, namely—congestion, exudation and purulence or infection. When more than one stage is present in any given case, they always follow in the order named.

The middle ear, and to a less extent, the Eustachian tube, can never be subjected to any of the foregoing types of inflammation without some change in the histologic structure ensuing. We may not be able to detect the slight changes resulting from one or two mild attacks of congestion or exudation of short duration, but we may be sure that they are present, otherwise the total result of repeated attacks of this character would not be evident; and evident they most surely are.

The cavity of the middle ear normally contains air of the same pressure as the atmosphere. The slightest variation in this intratympanic pressure is pathologic, and its results are pathologic in exact proportion to the degree and duration of the departure from the normal. This is true of diminished as well as of increased pressure. We may have negative pressure with or without blocking of the Eustachian tube. With a normally patent tube we may have negative pressure within the middle ear, as a result of the hawking back of secretion, or swallowing in the presence of nasal obstruction. The negative pressure brought about in this way becomes constant if we have blocking of the tube, as air may be aspirated from the middle ear continuously and the blocking not allow of a fresh supply sufficient to restore the balance of pressure. That is, we may have blocking of the tube which admits of aspiration, but does not allow air to get into the middle ear. Again, air may be forced into the middle ear through an obstructed tube and then become absorbed, thus causing negative pressure. This negative pressure within the middle ear, whether inter-

(4) Long Island Med. Jour., March, 1915.

mittent or constant, causes distinct pathologic changes which are in every instance in direct proportion to the degree and duration of the negative pressure. The blood-vessels of the middle ear and membrana tympani become dilated and we have passive congestion which may go on to exudation. The loss of support within the middle ear and the atmospheric pressure on the external surface of the membrana tympani cause retraction of the drum and the ossicles are forced into an abnormal position. If these conditions continue we have chronic thickening of the mucous membrana of the middle ear, and of the membrana tympani, loss of mobility in the ossicles and membrana tympani with the inevitable tinnitus and loss in sound conduction through the middle ear.

Increased pressure within the middle ear may be due to increased air pressure, congestion and exudation with or without infection. We must have blocking of the Eustachian tube to have increased air pressure, or an increase of pressure due to congestion or fluid within the middle ear. Air may be forced into the middle ear through a partially blocked tube and cause an increase in air pressure, as previously mentioned. Increased intratympanic pressure due to any of the above conditions causes the drum to be forced outward, carrying with it the ossicles. If the pressure continues we have a permanent dislocation of the drum and ossicles, and, if we have infection as well, a destructive process. The extent and the rapidity of these ear changes depend on the character of the pathologic factors at work in each case.

The nasal conditions which predispose to pathologic changes in the tube and middle ear may be very slight. If slight and intermittent in character and the accompanying result in proportion, they may be readily overlooked. Here again it is important not to overlook these apparently insignificant attacks, as they will if continued eventually cause marked middle-ear changes. The middle-ear cases due to intermittent blocking of the Eustachian tube caused by nasal congestion should be recognized early if we would conserve the ears. The more severe attacks attract atten-

tion and are more likely to receive adequate treatment. Infection in the middle ear should be diagnosed early and the membrana tympani incised promptly. A spontaneous rupture of the drum means that much damage has been done that could have been avoided by an early incision, the value of which can not be overrated. It relieves pressure early, shortens the course of the infection and conserves the ear. A few hours means much to these ears.

Nasal congestion, nasal malformation causing obstruction, nasal and sinus infection must be recognized as active etiologic factors if we would conserve the ear. Hypertrophy of the posterior ends of the inferior turbinates alone can cause pathologic changes in the Eustachian tube, with the secondary middle-ear involvement. Blowing the nose improperly in the presence of a nose and nasopharynx free of secretion can do much harm in the middle ear. If we have secretion with its ever-present infection, this may be blown into the tube and middle ear. Improper methods of cleaning the nose will do the same thing. Forcible drawing back of secretion is productive of much harm. We may do much to prevent evil by properly instructing our patients in these essentials. We have to treat results it is true, but if we recognize the causes and remove them early we shall have fewer results to treat. We should not have to say, "better late than never," but, "get it early."

Inflation and other methods of treatment of the tube and middle ear are assets if we first remove the cause, otherwise they are of little avail. It is amazing how often no attention is paid to the underlying cause in the nose and nasopharynx. Probably the reason for this is the method of caring for the ear, nose and throat cases in our clinics and hospitals. There is one department for the ear and another for the nose and throat, and usually there is no connection between the two departments in the treatment of the ear, nose and throat cases. The two departments are presided over by a different group of men, and the patient does not get the benefit of having the same man or the same group of men examine, diagnose and treat his ears, nose

and throat. In no other way can the individual get adequate treatment.

Our clinics and our hospitals are our schools, and here it is that we must train the men whom we expect to develop into efficient ear, nose and throat practitioners. If we can establish in our institutions of clinical experience and practice a single department for the ear, nose and throat, we may expect to develop men who will have a true appreciation of correlation in ear, nose and throat practice.

Otitis Media.

Acute Suppurative Otitis Media Due to Streptococcus Mucosus. These cases, according to Stutz,[5] usually occur in elderly individuals, are always retro-tympanal, and in a majority of cases tend to intracranial complications. The subjective and objective symptoms are mild compared to the severity of the process. The *x*-ray is of value in early diagnosis. Positive diagnosis is made by staining the discharge with thionin stain. Early diagnosis and prompt operation give good prognosis for recovery.

The Thionin Stain: Gruber's thionin in excess of distilled water is poured into a retainer, shaken once daily and left standing several days; then it is poured off and filtered. With the warmed filtrate the fixed slide is stained for from two to three minutes; washed in water; dried with filter paper and washed once with alsolute alcohol for differential; it is then mounted in balsalm.

Examination shows mucous masses red, fibrin and pus corpuscles dark violet, and among them the chains of cocci; the cocci are dark blue, their capsules light red.

Dyscrasic Otitis Media. In recent lues, generally in the presence of lesions in the mouth and nasopharynx, but also in the absence of such lesions, O. Beck[6] states that middle-ear disease may develop that differs from the ordinary forms. Like the otitis of tuberculosis or leukemia it has the appearance of a weakened local re-

(5) Archiv. f. Ohrenh., vol. 97, No. 1.
(6) Zeitschr. f. Ohrenh., vol. 72, No. 2.

action due very likely to a general constitutional weakness. The slight pain and the marked general disturbances are the characteristic symptoms. The patients complain of a sensation of fulness in the head and marked deafness which is often accompanied by labyrinthine symptoms. The drum is wet, rather grey-red in color, the short process and handle are distinguishable as in cases of secretory catarrh passing into an otitis suppurativa. Paracentesis discloses large amounts of pus. Beck has been unable to demonstrate spirochetes in the pus. There is very little tendency to mastoid or bone complications. He cites a case in which an otitis media of twenty-six years standing, due primarily to scarlet fever but now healed, though with relapses, began to discharge again after the patient had contracted lues and had broken out with the exanthem; it ceased after a thorough inunction cure. Later at three different times the discharge started up only to subside when the specific treatment was pushed.

Influenza and Otitis Media. Harold Hays[8] thinks that the influenza bacillus is rarely the direct cause of middle-ear complications. In the majority of instances, the ear condition arises from a general lowering of the resistance, which allows secondary infecting organisms to penetrate through the already infected mucous membranes of the Eustachian tube. These organisms, in the order of their importance, are the *Streptococcus mucosus capsulatus,* the pneumococcus, the *Streptococcus pyogenes,* the *Staphylococcus pyogenes aureus* and, more rarely, the *Bacillus coli communis,* the *Bacillus proteus,* and the Friedlander bacillus. Whether the influenza bacillus is really present in the ear infection, or whether it is merely overgrown by the other organisms is hard to say. The influenza bacillus is extremely difficult to grow except on blood media, and it is possible, therefore, that it may be present many times but not discovered.

The ear complications of influenza may be extremely severe, depending on the virulence of the organisms and the resistance of the patient. In the majority of instances, the patient suffers from dulness in the ears, per-

(8) Archiv. Diag., April, 1915.

haps with sharp shooting pains. The drum appears normal, but examination with the pharyngoscope shows a very intensely congested Eustachian tube which completely closes off the middle ear. We thus have what is called an acute tubal catarrh, which, if taken in time, will resolve very nicely and result in no complications. The dulness in the ear is caused by a rarefaction of the contained air within the middle-ear cavity.

The treatment of the Eustachian tubal orifice at the time when the inflammatory condition is confined to these parts is extremely important; and it is possible in many instances to retard the inflammation, thus preventing an infection in the middle ear itself, by timely and proper attention to such parts. Inflation of the middle ear through a highly inflamed tube, the mouth of which contains many virulent organism, is pernicious and unwarrantable. In such cases it is wiser to treat the cause of the condition and the inflamed mucosa of the nasopharynx rather than attempt to force a moderate amount of infected air into a part that is well closed off by Nature. Once the infection has been retarded, cautious inflation of the middle ear is necessary; and, fortunately, almost all such patients are cured even when the middle-ear symptoms are ignored for weeks.

Cause of One Ear Being Attacked Before the Other. Yearsley[9] attempts to determine the reason for one ear being attacked in chronic catarrhal otitis media before the other. He has tabulated twenty cases which seem to indicate that pathologic conditions in the nose, and the position of the patient while sleeping are the determining factors.

The majority of cases of chronic middle-ear catarrh are originated by the irritating effect on the nasopharynx of the secretions from an ill-drained nose, due to septal deflections and spurs and enlarged posterior ends of inferior turbinates. Such irritation is enhanced at night by the effect of gravity in the recumbent position; and, if the head be usually inclined to one side during sleep, secretions in the nasopharynx would naturally gravitate to other side and the lower Eustachian orifice would be bathed in them more or

(9) Jour. Laryngol., Rhinol. and Otol., May, 1915.

less continually. This very simple explanation would appear to account satisfactorily for the fact that one ear is attacked before the other.

Yearsley presents a table showing that out of twenty cases the right ear was attacked in fourteen. In these the nasal lesion was on the right in six, the left in three and indeterminate in five. But in not less than thirteen cases, the patients stated that they were in the habit of sleeping on the right side. The fourteenth had marked right nasal stenosis. In six cases, the first ear attacked was the left and in these patients the nasal lesion was on the opposite side in three cases, on the same side in two and indeterminate in one. Inquiry of these patients elicited the fact that they all slept on the left side.

Influenza Otitis: Mastoid Disease: Leukemic Otitis. Eitelberg[1] comments on the severity of the pain radiating from the ear which seems to be out of all proportion to the local findings. He has noted pain and tenderness in the neck region below the ear and about the angle of the jaw as a constant symptom and almost pathognomonic in children. The accompanying myringitis with the formation of bullae is also characteristic of influenza.

He reports the case of a woman who, following a nasal operation for polypi, developed a severe purulent otitis media followed by undoubted symptoms of mastoid involvement such as fever, tenderness, and edema over the bone. Operation was urgently indicated but obstinately refused by the patient. Under expectant treatment the woman recovered spontaneously and completely.

The peculiar features of the case are these; the tympanic cavity and drum membrane were entirely well before the swelling and tenderness of the mastoid disappeared, being the reverse order usually observed; the ear affection was on the side opposite the naris operated on.

This author also cites a case of otitis media developing in a man of 65, suffering from lymphatic leukemia, that ran a brief course with complete recovery.

(1) Wien. med. Wochenschr., May 8, 1915.

In discussing leukemic otitis he finds that the onset is usually denoted by a rapidly developing deafness accompanied by subjective noises and vertigo. As a rule, both middle and inner ear become affected. Acute leukemic cases are affected early, chronic cases later in the disease. Schwabach's investigations show that one-third of all leukemic patients develop ear complications.

Treatment of Acute Otitis Media. O. Welkinson[2] divides the treatment of acute otitis media into three stages: first, the presuppurative or pre-exudative stage; second, the suppurative or exudative stage, before the drum has given away; third, the stage after suppuration has taken place, either following incision or rupture of the drum membrane.

First Stage: Unfortunately the physician seldom sees cases in this stage. This is particularly true in the country. The average parent thinks little of an earache until it has caused enough discomfort to the sufferer to arouse the household, and by this time the middle ear is filled with an exudate. In the city, after years of training, a few families bring in their children at the beginning of an attack. Patients are often seen with a very well-marked congestion along the manubrium and about the annulus tympanicus, even before the drum membrane has taken any particular part in the inflammation. At this stage a great deal can be done to prevent the further development of the process.

Patients are given something for relief of pain; hot drops of glycerine, atropine and a sedative containing either tincture of opium or morphine. These should be instilled hot. If they are not hot, very little will be accomplished by their use.

Local applications of heat of some kind are always graciously received and are to be commended. A hot salt bag or hot water bag or a hot iron are convenient means of applying local heat, and they often bring relief. The ear should not be exposed after it has been subjected to any form of heat. The ear after it has been aching should be kept tied up during the following night.

(2) Virginia Med. Semi-Month., Sept. 24, 1915.

Many ears are undoubtedly permitted to go on to suppuration from neglect of this simple precaution.

Since a patient with acute otitis is usually suffering with a cold, means should at once be instituted for its relief. A calomel purge is indicated, followed with a saline or our good old remedy, castor oil which, especially in children, has a somewhat specific action in congestions of the nose and nasopharynx. The surest way of preventing the otitis from going on to suppuration is to keep the patient on light diet, with a liberal supply of water, and in bed for at least 24 hours. In all cases, except in very small children, sedatives are indicated when the pain is severe enough to justify them. Of these, aspirin and small doses of phenacetin with a little caffeine to prevent depression are to be preferred.

Treatment of the Suppurative or Exudative Stage: This will depend entirely on the condition found. If the drum is not yet bulging and the pain not severe, the treatment as given for the incipient cases above should be carried out, *i. e.*, use hot drops, hot local applications, depletion with mercury and confinement to bed with the ear tied up and wait 24 hours. If the case is going on to suppuration it will show by this time. The pain and temperature will naturally aid in determining the severity of the case. If there is a bulging drum, there is no use to wait; make a rather liberal incision through the posterior portion of the drum; not merely a paracentesis, but make a large opening while you are about it. A paracentesis is often worse than nothing and the word ought not be known in aural surgery.

If the drum is cautiously painted once or twice with equal parts of menthol, phenol (carbolic acid) and cocaine, it can be incised with but very little pain. The electric light in the speculum enables the unaccustomed practitioner to see better than the average head light. A middle-ear cavity that is filled with secretions is sufficiently deep to permit of incising the drum without incising the mucous membrane of the inner wall of the cavity, which is exceedingly sensitive and is not anesthetized by local application on the drum membrane. In small children and some nervous subjects a general anesthetic is often necessary, nitrous oxide gas being

the one usually prepared. After the drum is incised, hot antiseptic drops are indicated. These may be composed of equal parts of phenol (carbolic acid), tincture of iodine, and glycerine, or of boracic acid, grs. xv, alcohol ℥i, rose water, q.s. ℥i. If a sedative is still needed morphine or tincture of opium can be added. The ear should still be protected from the cold by a bandage.

Earache after the drum has been incised or after it has perforated shows one of two things: either there is poor drainage or a rather severe infection. If the hole in the drum is too small, as seen after the canal has been irrigated with some hot solution (boracic acid is a good one), the opening should be made larger after anesthesia has been secured, as already indicated. The physician will save time, give comfort to the patient, and hasten recovery by enlarging the opening. As a rule, it is best to make two incisions in these cases, making the first cut down from the perforation and the second one backward, thus permitting the wound to gap and give drainage.

If the pain is due to severe infection, the general condition of the patient deserves attention. Laxatives should be ordered, and the patient should be put to bed and kept there as long as he has fever. The ear should be irrigated with some antiseptic non-irritating solution. Boracic acid solution, weak phenol, or weak bichloride of mercury solution, are efficient.

The ear should be irrigated as often as every two hours in cases in which the discharge is free and acrid, *i. e.*, when it causes the external canal to become sore. As the discharge decreases, longer intervals should be allowed between the syringing. In cases of this class hot drops of atropine, morphine and chloral are of benefit.

℞

Morphine sulphate	grs. ij
Atropine sulphate	grs. iij
Chloral hydrate	grs. v
Glycerine	q.s. ℥ ss

Sig: Use five drops, hot, in ear every half hour until relieved.

Mastoid and Sinus Involvement.

Mastoid Disease. The importance of mastoid disease and the desirability of its early recognition and proper

treatment justifies much space being devoted to the subject.

The clinical picture of acute mastoiditis according to Clarence H. Smith[3] is variable and inconstant. Tenderness on pressure is the most valuable symptom. This tenderness is due to periostitis. Tenderness over the antrum or that part of the mastoid behind the auricle on a line with the auditory canal; tenderness over the tip of the mastoid; tenderness of the anterior border or that part of the bone between the antrum and the tip, or tenderness over the posterior border of the bone, all indicate mastoiditis. When the tenderness is not very great, it can be best brought out by comparing it with the sound side, using the same amount of pressure on both sides. Some patients, who are aware of the significance of this symptom, deny feeling any demonstration of pain. This has to be guarded against. In estimating the amount of tenderness in a child, the best plan is to begin pressing the cranial bones at a distance from the mastoid and watch the change of expression as you near it.

The only other condition which would give tenderness on pressure is a post-auricular adenitis, and in this, as a rule the ear symptoms are missing. A thickened cortex may interfere with this symptom, and there are numerous cases of true mastoiditis that do not show tenderness, but take it all in all, this is the most reliable symptom we have.

Pain in an ear that is discharging freely, or pain behind the auricle, is strongly suggestive of mastoiditis. Often these patients complain of neuralgic pains over the vertex and side of the head and face. Once the drum is opened, either by Nature or by the surgeon, if there is no involvement of the mastoid we should not expect pain. The pain of mastoiditis is worse at night, it is generally paroxysmal, and varies in intensity. Between the paroxysms of pain the patient is apt to feel discomfort and soreness of the mastoid region. Mastoiditis can exist without pain. In some of the worst cases, the patients never feel a twinge of pain and sleep undisturbedly.

A profuse discharge of straw-colored fluid or pus is

(3) New York Med. Jour., June 19, 1915.

very often pathognomonic of mastoid involvement. The middle ear is relatively a small cavity and can not produce or discharge much fluid if the process is confined to it. McKernon gave a very practical and valuable suggestion when he advised cleaning the canal thoroughly of all secretion, then watching for a drop of pus to exude from the perforation, wiping it away and seeing how long before another drop appeared.

A drooping of the postero-superior canal wall, in connection with other symptoms, corroborates the diagnosis. Perhaps a better way to describe this would be to call it a narrowing of the caliber of the auditory canal at the innermost part, and it can be best brought out by comparing it with the healthy side.

Fever may or may not be observed. Smith has often seen marked involvement of the mastoid cells with absolutely no rise in temperature. On the other hand, an elevation of temperature in a patient with a discharging ear, unexplainable in any other way, would suggest mastoiditis.

Displacement of the auricle is occasionally seen in infants and young children. It is caused by a rupture of the thin softened cortex and an escape of pus beneath the periosteum, which is lifted up from the bone, thus displacing the ear downward and forward. Occasionally this subperiosteal abscess is seen before the rupture of the drum. In a case seen by Smith recently in a boy 14 years old, a large subperiosteal abscess existed, with complete destruction of the mastoid cells, yet with an unruptured drum.

These symptoms are easily demonstrated, and a careful examination of the clinical picture should, in most cases, determine, by the presence of one or more of them, if mastoiditis exists, or in their absence exclude it as a complication of the middle ear disease.

There are certain other aids to diagnosis that are not so available, but which in doubtful cases are very valuable. The most important of these is the radiograph. A normal mastoid shows as a dark area with the bony cell partitions visible as light lines. A mastoid filled with pathologic material shows an abnormally light area. Both sides are radiographed and the normal mastoid

cells show up clearly and in a marked contrast to the dull, hazy cells of the diseased side.

In diagnosing an ear condition such as mastoiditis, we must always consider the possibility of furunculosis of the auditory canal. The error of confounding these two diseases is comparatively common. Where the two conditions co-exist, or a furunculosis ensues on a purulent otitis, the problem is often difficult. In uncomplicated furunculosis the points to remember are that manipulation of the auricle produces severe pain and that if care is taken to avoid movement of the auricle, we can press on the mastoid at will without causing pain. In furunculosis the speculum examination shows a swelling of the canal and if the drum is not hidden by this, it usually is seen to be intact.

Once acute mastoiditis is diagnosed, the general practitioner had better work with the otologist in the further guidance of the case. A large proportion of cases of acute mastoiditis under conservative treatment end in complete recovery. In a certain number the patients lose their acute inflammatory symptoms and go on to almost total resolution, leaving an area of necrosis in the walls of the antrum or nearby; the discharge from this dead bone escapes through the perforated drum, and we have a chronic aural discharge due to a chronic mastoiditis.

Another class of cases become "operative mastoids," that is, the symptoms do not improve with non-operative treatment or they become graver, and one feels that operative intervention is the safest measure to adopt. In the critical period while the patient is under observation, in addition to observing the symptoms already enumerated, the tongue should be watched. A badly coated tongue would certainly not be an encouraging symptom. Since the improvement in technique in mastoidectomy in the past fifteen years, it has ceased to be an emergency or life-saving operation. The prognosis is most optimistic as to complete recovery in the vast majority of cases, and the risk run surgically is very small compared to that taken in doubtful or severe cases by delaying operation.

Acute Mastoiditis. W. M. Mollison[4] describes three conditions from which acute mastoiditis must be carefully differentiated: (1) furunculosis of the external auditory meatus; (2) lymphadenitis of the mastoid glands; (3) herpes of the auricle and pain accompanying a facial paralysis.

1. Furunculosis of the external auditory meatus: Boils in the external auditory meatus sometimes give rise to edema of the tissues over the mastoid process, and this is so pronounced in some cases, particularly in adults, that the auricle may be displaced downward and forward, exactly as in some cases of acute mastoiditis. The main features in favor of furunculosis are: (*a*) presence of the boil in the meatus, though this does not exclude the possibility of an otitis media; (*b*) pain on moving the prima, absent in a case of mastoiditis; (*c*) tenderness in the pre-auricular region, due to gland infection; (*d*) the tenderness over the swelling behind the ear, if present, is more marked on pressing in a forward direction against the auricle than deeply on to the bone; (*e*) the history of the case, the onset of the pain being gradual and becoming worse, whereas in acute otitis the onset is sudden, and often disappears or becomes less on rupture of the membrane (the patient may, too, have had boils in other parts of the body); (*f*) hearing almost normal.

In cases in which a suppurative otitis media is accompanied by boils in the meatus and a swelling over the mastoid process, a diagnosis can only be made by keeping the patient under observation and treatment for a day or two.

2. Lymphadenitis of the mastoid glands: One or two very small glands can normally be felt over the mastoid process, and these may be infected from septic conditions of the scalp and hair. The resulting swelling, redness, and edema may give rise to considerable difficulty, particularly in cases in which there is already an otorrhea. Discovery of a focus of infection will be of great help in arriving at a diagnosis.

3. Herpes of the auricle and pain accompanying a facial paralysis: Herpetic spots over the auricle, due

(4) Practitioner, October, 1915.

to posterior poliomyelitis of the second cervical nerves, give rise to very severe pain and tenderness about the ear; the pain and tenderness may persist after the vesicles have dried up. The condition is entirely analogous to herpes zoster, and, as in that condition, the glands draining the affected area may become enlarged.

Permeating Mastoiditis. J. B. Pike[5] uses the term, "permeating mastoiditis." He lays down the following axioms: (1) that the infection is microbic; (2) that it reaches the mastoid antrum through the aditus; (3) that the infection, with consequent inflammatory reaction, may spread in three directions: outward, behind the meatus; upward, to the cerebral surface of the petrous bone; and backward, toward the lateral sinus.

The spongy character of the mastoid lends itself readily to infective permeation, which may be due either to infective pus from the middle ear or to the passage of bacteria into the mastoid cells. When the infection is due to middle-ear abscess, the drum is, as a rule, perforated, and there has been for some time a chronic purulent discharge. When bacterial infection passes through to the mastoid with but little middle-ear mischief, the symptoms are masked, and the case is much more difficult and insidious.

Mastoiditis usually gives rise to caries of the spongy mastoid bone, and seeking the surface in one or more directions sets up a periostitis, proceeding to suppuration. It may, however, give rise to compact osseous tissue being formed, and it is not very uncommon to find layers of ivory-like consistence surrounding the foci of disease.

Mastoid infection may be very chronic, the bacteria lying in wait as it were for the opportunity of lessened resistance to invade surrounding tissues. In one case, scarlatinal poison lay dormant in the mastoid cells for months after recovery, and then set up a reflex middle-ear abscess, mastoid caries, periostitis, and, which was proof of the nature of the infection, secondary scarlatinal nephritis.

In the light of many mastoid cases which have been

(5) Practitioner, October, 1915.

reported, it is evidently of the highest importance not only to have a clear mental picture of the progress of infection and its methods, but to classify them as well somewhat as follows:

1. Abscess of middle-ear with secondary mastoid infection through the aditus.
2. Microbic infection of the mastoid making its way towards the external periosteum.
3. (The most insidious and dangerous) Microbic infection permeating the mastoid bone in the direction of the periosteum of the cerebral surface, threatening meningitis and brain abscess.
4. Combined with the above, infection passing backward toward the lateral sinus, and causing thrombosis and septicemia.

Hemorrhagic Mastoiditis. H. W. Loeb[6] reports a case of acute hemorrhagic mastoiditis. A mastoid operation was performed three days after the beginning of an acute otitis media with a profused serosanguineous discharge. The soft parts were not swollen and gave no evidence of any inflammatory or septic condition. When the periosteum was elevated the bare bone appeared almost blue in color, as if there had been marked necrosis present. Upon chiseling away the cortex, this was found to be due to the presence of a reddish blue clot filling every cell that was opened. In fact, it was possible to identify each cell by the color of the clot showing itself through the thin bone. No pus or granulation tissue was found in any of the cells, and the antrum was filled with a clot similar in character to that found in the other mastoid cells. The mastoid was entirely exenterated, the cavity in the bone packed with plain sterile gauze, and the skin incision closed by sutures, except at its lower portion, which was left open for the gauze drain.

Temperature six hours after the operation was 102.5 F. It continued close to this mark for eight hours, when it began gradually to recede. It rose again to 101 F. during the second evening after the operation, and to 101.5 F. on the following day, but after that, during

(6) Ann. Otol., Rhinol. and Laryngol., September, 1915.

the week following, it gradually approached the normal with slight elevation every evening.

Loeb discusses three interesting questions brought up by this case.

1. The organism differed from that described by Davis and Rosenow which was encapsulated and Gram-positive, two factors which, according to Rosenow, may depend upon cultural conditions within and without the body. It differs materially from the *Streptococcus mucosus* described by Neumann and Ruttin; in fact, the clinical course of the case reported is entirely at variance with that of the type reported by these writers. Alberti, who made an extensive study of the bacteriology of acute mastoiditis, does not mention an organism possessing the characteristics of that which is here reported.

2. The hemorrhagic character of the inflammation, according to the general rule, would indicate a virulent type of infection. A fairly detailed study of the literature has failed to reveal instances in which other operators have found a similar picture. The condition present could not have been anticipated by any of the symptoms, unless the uncommonly long duration of the serosanguineous discharge might indicate a hemorrhagic exudate. It was exceedingly interesting to observe each cell come into view as the clot appeared visible through the thin bony wall of the cell.

It is quite possible that more of these cases of hemorrhagic mastoiditis would be found if operative interference were called for early in the course of the disease.

3. The justification for operating so early in a mastoid affection may be doubted. However, an infective agent, unquestionably of high virulency, symptoms rapidly increasing in severity, in spite of copious discharge, increasing leukocytosis and the compromising possibility of an acute meningitis, call for an operation in no uncertain tones. The post-operative fever and leukocytosis add weight to the evidence.

End-Results of Radical Mastoid Operation. The ultimate results of a radical mastoid operation, especially in regard to the hearing, are discussed by S. MacCuen Smith.[7]

(7) Laryngoscope, June, 1915.

Generally speaking, the degree of hearing depends on the condition of the tympanic wall, more particularly whether the round or oval window has been disturbed during the operation; in other words, if the functional activity of the internal ear remains the same as before operation, the hearing in the average case should be as good after this surgical procedure as before.

The author's record shows 32 per cent. of operative cases in which the hearing is definitely better; in 49 per cent. it remains the same; of the remaining 19 per cent., in 11 per cent. the hearing decreased after operation, according to actual records, while in the balance, or 8 per cent., it decreased according to the statement of the patient, no record existing of the hearing previous to operation.

It is interesting to note that in most of the patients whose hearing decreased, the impairment was gradual in development, and may, therefore, have represented the natural impairment of hearing incident to a continuation of the pathologic changes arising from a former chronic otorrhea.

We are justified, therefore, in most instances, this author believes, in stating that the operation is not likely to result in an impairment of hearing, though there are some exceptions to this rule. Occasionally granulation tissue will spring up, covering the tympanic wall and ultimately forming a solid fibrous layer which will injure the hearing power. In some of the author's earlier cases, he is confident that the subsequent loss of hearing was due to the crude method of skin-grafting employed. This, however, could probably be avoided by the use of modern methods.

Should the hearing be markedly worse immediately following operation, it would seem to indicate that some injury to the perceptive apparatus has been caused by the operator. These cases, however, should not be confused with those showing a slight temporary impairment of hearing following the radical mastoid operation, due to the general trauma incident thereto.

The radical mastoid operation should be regarded as a major procedure. Especially is this true when we consider the opportunities for causing irreparable damage.

Nevertheless, this operation is not only safe, in the hands of competent operators, but is usually productive of a maximum amount of good, and is, therefore, wholly justified. It must be borne in mind that the radical operation is frequently performed as the first step for the relief of an intracranial lesion. The recorded mortality, therefore, is no doubt due to the complication present and not to the procedure itself.

Septic Sinus Thrombosis. According to G. G. Hall,[8] the most characteristic symptoms of a typical case are pronounced chill with sudden rise in temperature, followed by a prompt subsidence to normal or below occuring in a case of otitis media, or following an operation for mastoid trouble. The break in temperature is often followed by a profuse sweat. Such an occurrence would warrant a diagnosis of sinus involvement and the institution of active measures for relief without further delay. During this chill, fever and sweat, the pulse and respiration are correspondingly affected. Some writers have observed that pain is greater in cases of sinus thrombosis than in uncomplicated middle-ear or mastoid conditions and nausea and vomiting may occur. About one-third of the cases show choked disc. Mentality is usually normal, except during periods of exceedingly high temperature. There may be edema over the mastoid region extending outward and downward around the exit of the mastoid emissary and occipital veins. Palpation of the jugular in the neck is a sign of doubtful occurrence. In unilateral sinus thrombosis compression of the healthy jugular will cause an artificial temporary choked disc and dilatation of the temporal vein on the healthy side.

It should be remembered that some cases are ushered in without a chill or there may be no decided fluctuations in temperature. Such cases are diagnosed by careful study of the case, the appearance of the mastoid wound over the sinus in case an operation has been performed, and the fact that the patient presents symptoms of profound illness explainable under no other supposition.

The mortality of the disease varies considerably. In thirty-eight cases reported by Beck, the mortality was

(8) Lancet-Clinic, June 19, 1915.

approximately 20 per cent. In the seventy-three cases reported by Toby, the mortality was about 16.66 per cent. In Calhoun's one hundred cases, the mortality was 41 per cent. for the different operators reported. These results are largely accounted for by the differences in operative technique, all operators agreeing that early recognition of the condition and early operative procedure for its relief brings almost uniformly good results, whereas cases seen late with operation of the patient in profound shock or with metastatic abscesses already present is productive of a high mortality.

In operating upon cases of sinus thrombosis Hall favors wide exposure of the sinus in the region of the mastoid and double ligation of the jugular vein through a comparatively small incision. He does not favor resection of the jugular vein or exenteration of the bulb. While such a procedure better disposes of the infected area than any other method, it is open to several objections. In the first place it is a formidable operation, and one that will take considerable time in its performance. Secondly, it is one that is not commonly within the scope of the operator of average experience. Third, it would increase the shock in an already weakened individual. Fourth, there is a much simpler procedure, namely, simple ligation, which in a large proportion of the cases at least is equally effective.

Symptomatology of Septic Sinus Thrombosis. C. F. Pfingsten[9] in a discussion of sinus thrombosis gives the following as the symptomatology of the septic variety.

Pain and Swelling in the Ear and Neighborhood: Pain is often elicited by pressure or percussion over the posterior part of the mastoid, in the region of the sigmoid sinus or mastoid foramen, even when there is no evident mastoid disease. There is frequently also pain or pressure over the upper third of the posterior cervical triangle, in the situation of the condylar and deep veins of the neck. This part should always be examined, as the presence of pain here is distinctly significant. Over the upper part of the internal jugular vein pain is also often elicited by pressure; that is unusually found earlier than the pain in the neck. At the

(9) Jour. Mo. State Med. Ass'n., June, 1915.

same time at the edge of the sternomastoid muscle a hard, cord-like swelling may in some cases be felt, the thrombosed internal jugular vein. It is to be remembered, however, that general septic infection often exists without tenderness or swelling over the internal jugular, and probably the more prominent is the thrombus in the upper part of the internal jugular the less, for the time being, is the danger of general septic infection. In like manner, when an abscess forms, as is sometimes the case at the late stage of the disease around the internal jugular, there is less danger of systemic infection. Such an abscess is due to infection of the cervical glands and cellular tissue surrounding the vein and begins with a brawny swelling and matting together of the tissue, the purulent formation taking place under the deep cervical fascia. This should be distinguished from the suppuration which takes place in connection with Bezold's abscess. Edematous swelling caused by obstruction to the flow of blood through the emissary veins is sometimes seen extending from the mastoid process to the back of the head and even to the temporal region. Such swelling over the mastoid due to venous obstruction must not be confounded with mastoid periostitis. The mastoid vein is in rare cases dilated. The internal jugular vein and the veins of the neck and cheek may be at first dilated, with, in some cases, swelling of the cheek and eyelids owing to the overdistension. After a time this dilatation disappears through the establishment of the collateral circulation, which diverts the blood to the opposite internal jugular. This venous stasis may also produce a colorless swelling, very tender to pressure, on the side of the neck along the inner edge of the sternomastoid muscle.

Headache: This is in most cases a prominent symptom, although it is usually neither severe nor so long continued as in brain abscess or in meningitis. However, when the disease is complicated with meningitis, the pain may be much more intense and continuous, but the chills in this case may not be so marked.

Digestive System: This is generally more or less involved. There is in the great majority of cases sickness or vomiting in the early stages and vomiting may con-

tinue for weeks. The tongue is dry and coated, and the breath fetid. There may also be severe diarrhea with abdominal pain, the stools being very offensive. The spleen is generally enlarged.

Chills: The most prominent and characteristic phenomena are frequently recurring and severe chills, followed, especially in the later stages, by profuse perspiration. These chills may occur every day or several times a day, and may continue as long as half an hour. It is right, however, to observe that chills may be absent till a comparatively late stage of the disease; and, in a certain proportion of cases, especially in children, there may be at no stage well-defined chills. There is nearly always in these cases a feeling of chilliness and coldness of the extremities; careful inquiry should be made for these as the patient may not mention them.

Temperature: The behavior of the temperature is of great diagnostic importance, being subject to striking oscillations. Beginning with the chill, it may at once rise from the normal to from 102 to 105 F., falling again, it may be, in a few hours to normal or a little above normal. These oscillations may take place more than once in twenty-four hours, and are very significant of the nature of the disease.

Pulse: The pulse is rapid during the periods of high temperature, slowing down with the fall of the temperature. It becomes small and weak as the general systemic infection increases.

Respiration: The respirations are rapid during the high temperature or when pulmonary symptoms develop. Pulmonary complications are very common in consequence of infarctions in the lungs giving rise to septic pneumonia and abscess formations, in some cases with gangrene. This serious complication is usually ushered in by hurried breathing, variable pain or stitch in the walls of the chest, cough and expectoration streaked with blood or having prune-juice character; moist râles are also heard on auscultation. At first auscultation may not reveal these septic infarctions if they are confined to the central parts of the lung. The expectoration may become purulent and copious and it sometimes emits a gangrenous odor.

Nervous Symptoms: Vertigo may be complained of, although it is not usually a striking feature. Disturbance of vision is observed when the cavernous sinus is involved. In a considerable number of cases optic neuritis is found. Paralytic phenomena, both general and ocular, are not so often observed in connection with the septic thrombosis limited to the lateral sinus as when the other venous sinuses are involved. The pressure of the thrombus on the nerve trunks passing through the jugular vein, sometimes produces characteristic symptoms. Various observers have reported the existence of phenomena due to irritation or paralysis in the region supplied by the vagus, glossopharyngeal, or spinal accessory nerves. When the vein which passes through the anterior condyloid foramen is thrombosed, the hypoglossal nerve may be involved. The symptoms of thrombosis in the cavernous sinus may be very numerous and varied, being produced either by stasis of its venous blood or by pressure on the nerves lying close to the sinus. Stasis of the blood explains the occasional existence, in connection with this form of thrombosis, of exophthalmos, temporary blindness from edema of the retina, and swelling of the forehead, eyelids, and nose; while pressure of the thrombus on the abducens nerve or on the oculomotor may cause, in the former case, turning in of the eyeball from paralysis of the external rectus muscle, and in the latter, the symptoms of internal and external ophthalmoplegia—namely, paralysis of accommodation, dilatation of the pupil, ptosis, and downward and outward squint. When the thrombosis extends to the superior longitudinal sinus, serious symptoms may arise, such as epileptiform or apoplectic phenomena, probably due to effusion into the cortex of the convexity of the brain from obstruction to the flow of blood through the sinus. In children, there may be bleeding from the nose, owing to the fact that in childhood part of the venous blood from the nasal passages is discharged into the superior longitudinal sinus, and the stasis of the venous circulation in the nose caused by obstruction of the sinus leads to hemorrhage. From the same cause the veins passing in childhood from the anterior fontanelle to the temples and auricles may be

dilated and prominent. General convulsive attacks have been rarely observed when the thrombus had extended to the superior longitudinal sinus.

Mental Symptoms: The intellect usually remains quite clear to the end, if the disease be uncomplicated with abscess in the brain or meningitis. In the abdominal or typhoid type there may, however, be muttering delirium.

Diagnosis of Sinus Thrombosis. H. B. Graham[1] discusses the diagnosis of sinus thrombosis and the difficulties encountered in typical cases. He divides the symptoms into five classes:

1. Local signs; those due to the mechanical presence of a thrombus in the vein:

The edema back of the mastoid is produced by an inflammatory trouble in the periosteum covering the mastoid and becomes of value as a help in the diagnosis of sinus thrombosis only when it is localized over the emissary vein region; this tenderness over the emissary vein can only be considered suggestive in case other signs are present, for it is oftener present in simple mastoiditis. Signs of this character may truly become of great value in cases that have shown little or no mastoiditis, for it is in cases showing sclerosed mastoids that we are particularly prone to see thrombosis. The swelling and tenderness over the jugular vein have been so marked, in some cases, that the jugular could be rolled under the finger as a stout strand, and tenderness was confined entirely to the vein. At other times, in case of marked septic involvement of the vein, there is simply a diffuse tenderness and swelling located in the whole neck such as is recognized in a Bezold's abscess.

The stasis in the veins of the head has been recognized for some years. It is so fleeting and is so dependent in case of examination of the disk veins on the personal equation of the examiner that one should be very careful about allowing the sign to weigh in the diagnosis in doubtful cases.

Of very great importance is the physical appearance of the bone over the sinus and of the sinus itself, at operation. Only by uncovering a sinus can one be sure

(1) Jour. Amer. Med. Ass'n., Sept. 4, 1915.

of its exact condition; still if the bone is not pathologic in appearance and the blue vein can be seen through the thin layer of bone, one can be safe in a diagnosis of non-involvement in the presence of no symptoms referable to the vein.

In many cases at operation, we find a comparatively free mastoid only to expose an extradural abscess after following a small dark colored sinus or granulation area over the sinus. These hidden abscesses are prone to produce changes in the sinus wall, covering it with granulations, which, if disturbed, open the way to an infection of the vein content. The firm non-resistant vein may or may not be filled with a thrombus, and it is well in cases that have shown few general symptoms to wait before exploring the vein even with a needle.

2. Signs referable to the entrance into the blood-stream of toxins or bacteria or both, from the diseased vein and its contents:

The chilly sensations, chills and rapid rise and remission of temperature are too well known in the septic cases to need much comment. It is astonishing to note the complacency with which these startling symptoms occurring in ear cases are looked on by many practitioners.

One chill alone is not enough to confirm a diagnosis, suspicious as it may be. Bondy reports a case in which, ten days after a radical operation, the patient had a severe chill and high fever. The next day the temperature was normal and remained so. One should always wait for a second chill before operating or have enough other evidence to make a pretty positive diagnosis.

A very valuable sign is the presence of a sudden change in the general condition and appearance of the patient. He stands with difficulty, feels suddenly exceptionally nauseated, is thin, haggard and aged looking, with the sallow, dry appearance of the skin, which is so characteristic of all cases of septicemia. This transformation from a cheerful, possibly feverish-looking patient to a quiet dejected object may take place inside of half an hour; even without the presence of chills, a high fever should put the attendant on guard.

The blood in the septic cases show both an increased

leukocyte, and increased polymorphonuclear count and with the presence of several rising counts may help, although any collection of pus may produce the same picture.

3. Signs referable to the lodgment in remote areas of particles from the thrombus:

These consist of joint pains and swellings and edemas over remote areas with heart irregularities due to an endocarditis. They are not frequent, but when present are of the utmost value in the diagnosis.

4. Signs referable to the extension of the inflammatory process to the meninges:

The severity of these signs seems to have no relationship to the extent of involvement of the meninges. Intense vomiting, headache, slow pulse and Kernig sign have been reported by Hoffman in a case of simple serous involvement, in which all disappeared on emptying the vein; and we all have seen cases of extensive meningitis with but few, if any, symptoms referable thereto.

The headache, dizziness and choked disc are the most frequent of these signs and have been more insisted on as diagnostic features on account of their comparatively early appearance. The slow pulse, vomiting, Kernig sign, mental excitability and paralyses are more the signs of a purulent meningitis, and occur as a rule so late that the case has become hopeless.

The diagnosis of the presence of a thrombosis in a case of suppurative otitis is often difficult enough, but it becomes doubly so when we consider the possibility of the simultaneous presence of other affections. The literature is full of mistakes and undoubtedly many have been made that never have seen the light of day in print. Malaria, endocarditis, tuberculosis, hysteria, puerperal processes, typhoid, pneumonia, adenitis, erysipelas, syphilis and, in children with measles or scarlet fever, a nephritis or adenoid infection, have each in turn been mistaken for sinus thrombosis.

Probably the most frequent mistake in diagnosis is that of malaria, on account of the similarity of the temperature curve. Urbantschitsch has collected six cases in the literature with simultaneous occurrence of otitis

media and malaria; in each case the symptoms were taken for those of sinus thrombosis.

Streptococcus Hemolyticus in Sinus Thrombosis. H. Heiman and M. J. Ballin[2] report a case of sinus thrombosis in which blood culture showed the *Streptococcus hemolyticus.* Blood smears showed the same microörganism and the septic temperature continued several weeks after removal of the thrombus. The patient, a boy 8 years old, had apparently recovered from an attack of double otitis media associated with pneumonia three weeks before admission to the hospital. The patient had characteristic chills and temperature but without apparent ear or mastoid suppuration. Operation showed a hard ebonized mastoid with an abundance of pus in the lateral sinus.

In reviewing this case, several interesting features present themselves from a surgical point of view:

1. History of a mild aural discharge from both ears of one week's duration, three weeks prior to admission to the hospital.

2. The complete absence of all active otitic manifestations and clinical symptoms indicative of a sinus thrombosis.

3. The finding of a positive blood culture containing hemolytic streptococci which permitted the tentative diagnosis of a sinus thrombosis: Up to the time of the result of this blood culure, the cause of the septic condition was unexplained, and it was only by this means that the presence of a septic focus in the sinus could be reasonably suspected. This was substantiated later by the operative procedure, and again emphasized the importance of taking blood cultures in all cases of an obscure nature running an unexplained septic course. The case, furthermore, corroborates the laboratory findings of Libman, who maintained and conclusively demonstrated that in those cases in which there was a history of an aural affection, and the blood culture was found positive, a thrombosis of the lateral sinus was almost invariably present. His investigations, moreover, showed that sinus thrombosis and meningitis are the only otitic complications giving rise to a bacteriemia.

(2) Jour. Amer. Med. Ass'n., March 20, 1915.

That these findings were correct in the majority of cases was substantiated by the conditions found at the time of operation. For, in the ten cases in which operation was performed in the otologic service of Mount Sinai Hospital by Gruening, and in another series of cases reported by Oppenheimer, the blood culture was positive in nearly every instance, and a septic thrombus was found at the time of operation.

One must not forget, however, that even in cases in which a thrombus of the sinus is present, the blood culture is not always positive at the first examination. According to Libman, this may be due to the fact that the blood culture may have been taken before a bacteriemia has been established, or the bacteria may be in the blood in such small numbers that they are not found in the amount of blood taken for the culture. It may also happen that below the infected clot there may be another obturating uninfected clot which prevents the bacteria entering the circulation, or there may be an infected thrombus completely closing the lumen of the vessel.

For these reasons, it is generally advisable, when an involvement of the sinus is suspected, to make repeated examinations of the blood. The fact that the blood culture is negative at one time and positive at another may, perhaps, also be explained by the fact that the bacteria are disseminated into the blood stream at certain periods, and in particular during the height of the fever.

In the case reported, the blood culture was still positive after all septic foci were apparently removed from the right sigmoid sinus and bulb.

As it was difficult to find an explanation for this, the third operation, that is on the left or normal ear, was undertaken, with the idea that the sigmoid sinus on that side might also be involved. Nothing was found, yet the blood cultures taken subsequently were all negative. It was apparent that the last procedure had nothing whatever to do with this, and it may have been that the continuance of these positive blood findings was due to some small septic focus which was still lodged in either the sigmoid or petrosal sinuses, or in the bulb of the affected

side, or that pieces of the thrombus may have entered the circulation, causing metastatic foci without any clinical manifestations. When this obscure focus was overcome by the defensive power of the blood, there were no longer bacteria disseminated into the general system, and the blood cultures taken subsequently were found negative. In spite of the absence of bacteria in the blood, the patient still presented the symptoms of a general infection, which continued for some time.

4. The hard ebonized mastoid bone, apparently free from any destructive changes, and solid throughout: There were no evidences of a perisinous inflammatory condition. It did not appear therefore, that infection of the sinus took place, as is usually the case, by direct extension of the suppurative process in the bone, but through the anastomoses of the veins of the middle-ear and those of the meninges, or by way of the emissary veins of the mastoid bone. That infection of the sinus frequently develops in this way without any macroscopic changes is a well-recognized fact. It seemed that in this case, the authors were dealing with such a mode of infection; this may have been, however, one of those unusual forms of primary thrombosis of the jugular bulb. In such cases, infection takes place directly through a dehiscence in the floor of the tympanic cavity into the jugular bulb, whereupon the septic process extends upward into the sigmoid sinus, and downward, causing a phlebitis of the jugular vein.

5. The finding of pus by aspiration of the sinus: This procedure, which the authors employed in a number of cases, has the advantage that one can readily ascertain the contents of the sinus, without incising its wall. Of course, it may happen that one obtains a quantity of blood at the place of puncture and is thus made to believe that the sinus is free from infection, while in reality there is a septic thrombus above or below, which does not entirely obliterate the lumen of the vessel. In this case, however, the thrombus so completely filled the vessel that aspiration immediately revealed the presence of the sepsis. For this purpose a large needle was employed, introduced into the lumen of the vessel at an acute, rather than at a right angle; by observing this

precaution, one avoids penetrating the inner wall of the sinus.

6. Excision of the internal jugular vein before curetting the sinus: As soon as the presence of a septic process has been established in the sinus, either by aspiration or by incision, it is advisable to proceed immediately to the resection of the vein. In the case reported, as soon as the authors learned that they were dealing with a suppurative condition in the sinus, the parts were not disturbed until the jugular vein and part of the facial vein were first excised. This having been accomplished, attention was then again directed to evacuating the contents of the sinus.

The authors are of the opinion that it is always advantageous to follow this mode of procedure, for, by doing so one prevents septic material and particles of the thrombus, which have been loosened by the operation, from entering the general circulation and setting up metastatic foci in other parts of the body.

The question frequently arises whether it is better to excise or to ligate the vein. It has been the authors' experience, and it seems to be the consensus of opinion of other observers, that excision is always preferable. This is based on the fact that almost every case of sinus thrombosis is associated with a phlebitis of the jugular vein. If, therefore, the vein is only ligated, it is difficult to tell macroscopically at the time of the operation how far the phlebitis extends, and as often happens, a part of the infected vein remains below the ligature, and serves as a means of re-infection of the blood.

Other Complications and Sequels of Otitis Media.

Fistula Symptom in Congenital Lues on Pronouncing Letters "M" and "N." E. Ruttin[3] reports two cases of congenital lues in which the fistula symptom was typical according to Hennebert, both patients having had a chronic suppurative otitis media of years' standing. In one case when the patient would pronounce the letter "M" or "N" he would be seized with marked vertigo but no nystagmus. The other patient had both vertigo and nystagmus on pronouncing these letters, increased on looking sharply to one side or the other. In neither

(3) Austrian Otol. Soc., February, 1915.

of these cases did the use of pneumomassage cause the slightest sign of vertigo or nystagmus. This latter is a phenomenon that Ruttin has observed in other fistula cases even when the fistula symptom was so marked that pressure on the tragus caused marked nystagmus. However, when the pneumomassage compression is applied, or aspiration alone, the typical nystagmus and vertigo are elicited. The explanation for the absence of the symptom when rapidly alternating compression and aspiration are used as in pneumomassage, is that these rapidly following irritants of equal strength and opposite character exactly neutralize each other and thus no reaction follows either.

Case of Numerous Complications Following Cholesteatoma. This case is reported by Mayer.[4] A ten-year-old girl during the course of a chronic suppurative otitis media developed symptoms of meningitis when brought in and showed an immense phlegmon of the neck extending down to the clavicle. At operation, the bulb was opened and the thrombosed superior petrosal sinus followed up to the posterior semicircular canal. The abscess cavity was opened up from the bulb down to the mediastinum. The jugular was full of pus. The mediastinum was drained. An abscess was found in the occipital lobe and its opening was followed by brain prolapse. This prolapse was later cared for by a plastic, periosteal flap being used according to Hacker's method. The patient recovered completely and was exhibited before the Austrian Otological Society.

Pharyngeal Abscess a Sequel to Ear Disease. D. McKenzie[5] believes pharyngeal abscesses are more frequently caused by ear disease than is ordinarily recognized.

There are four different ways in which otogenic pharyngeal abscess may be produced. First, by direct extension of the purulent disease from the middle ear through the petrous bone to the pharynx; secondly, by the wandering of an extradural abscess of the middle cranial fossa to the tip of the petrous, and thence by the foramen lacerum anterius or otherwise to the extra-

(4) Wien. med. Wochenschr., April 17, 1915.
(5) Jour. Laryngol., Rhinol. and Otol., January, 1915.

cranial inferior surface of that bone; thirdly, by the direct extension of purulent disease from the pneumatic cells in the tympanomastoid osseous structure to the under surface of the occiput and thence to the pharynx in a manner described later on; and fourthly, by the wandering of an extradural abscess of the posterior cranial fossa to the same suboccipital region.

These four methods may be conveniently described in pairs, the first two together, since in both of them the pus reaches the pharynx from the region of the tip or under surface of the petrous bone—we may term this the subpetrous variety—and the last two together since in them the pus reaches the pharynx from the under surface of the occiput—the suboccipital variety.

Diagnosis: Lateral or retropharyngeal abscess from strictly local causes is not an uncommon condition. The important thing is that we should be able to recognize the fact that it proceeds from the ear when it does so. At times this will be impossible, and at other times the real state of matters will escape notice. The combination of ear discharge with pharyngeal abscess should awaken suspicion, and this will be strengthened if temporal or facial edema, fixation of the jaw, or cervical cellulitis is present. The importance of detecting the true nature of the case lies in the fact that a radical mastoid operation would be called for if it had not already been performed.

Prognosis: The prognosis of the otitic complications which lead to pharyngeal abscess is serious, until the pharyngeal abscess forms and breaks or is opened. Then a lightening in the symptoms takes place with surprising rapidity, the flow of pus from the ear and from the cervical wounds lessens and stops; the infiltration cellulitis diminishes; and pain and constitutional symptoms subside and disappear, and the patient recovers.

The reason for this welcome transformation lies in the fact that the pharyngeal extension is generally the most dependent pocket of a diffused and wide-spread abscess, so that once it is opened efficient and continuous drainage of the whole region is effected. So strictly is this exemplified in the records that Guillemin has suggested that in severe suboccipital cellulitis the surgeon himself

should, by breaking through the barrier of the rectus lateral with a blunt instrument, offer this line of escape to the inflammatory products.

Naturally the prognosis is less favorable if the other complications are dangerous.

These conditions render fallacious any argument we might base upon case mortality.

Preventive Treatment: In the suboccipital variety, case naratives show operation on the initial suppuration to have been delayed for one reason or another. Thus, the first method of preventing the cervical cellulitis and other complications of which the pharyngeal abscess is merely an expression, is to open up mastoid cells as soon as mastoiditis is diagnosed. This, of course, is now the general practice. Consequently, the opinion is that these complications of suppurative otitis are probably rarer today than formerly. This remark does not apply with the same force to the subpetrous variety in which the extension of the suppuration to the pharynx is an early event in the evolution of the case.

Curative Treatment: In the subpetrous variety, if diagnosed early, the treatment already mentioned may be adopted. An opening is made with a gouge in the anterior bony wall of the external auditory meatus, so as to form a window close to the tympanum and the temporo-mandibular articulation. This leads to the subpetrous abscess. After the pus has been evacuated, the abscess cavity is lightly packed through the artificial opening and the patient is kept lying on his back, to encourage drainage. The mastoid wound is left open and the packing is removed and replaced daily by this route.

This method is recommended in early cases, that is to say, before the bulging in the pharynx has attained to such dimensions and prominence as will enable it to be easily and safely operated through the mouth. But if the pharyngeal wall is prominently bulging, the experience which has been gained in the treatment of the suboccipital variety shows that, in spite of the very natural *á priori* objections to opening an abscess due to bone

disease in the pharynx, this route of access and of relief is not only quite sure, but is also curative of the original disease upon which the pus formation depends. This method may therefore be safely recommended, McKenzie thinks, in the treatment of this particular variety also.

The older surgeons have been at pains to open these abscesses from the outside of the neck by an incision through the skin in front of or behind the sternomastoid. But unless there is extensive or progressing cervical cellulitis an external incision is unnecessary. Should widespread cervical cellulitis be present, especially if it has reached a level lower than the angle of the jaw, then undoubtedly most surgeons would consider an external incision not only justifiable but imperative.

The opening of the abscess through the mouth presents no difficulties whether it be situated on the lateral or on the posterior wall of the pharynx. The plan followed in opening simple peritonsillar abscess is applicable also to the otogenic variety. A small incision is made through the mucous membrane. Through the incision the closed blades of a pair of dressing forceps are inserted into the abscess cavity, opened widely and withdrawn open. Care should be taken to keep the opening patent until the abscess is healed.

In the suboccipital variety, the best method of attaching the cervical cellulitis after the mastoid cells and their extensions have been opened up, is to detach the sternomastoid muscle, to remove the apex of the mastoid process, and to work inwards close to the bone of the digastric fossa and the jugular process of the occiput, so as to provide free exit for the pus in this region. This dissection may necessitate the division and ligature of the occipital artery. Additional incisions of relief at lower levels in the neck will be called for when the circumstances demand them.

The pharyngeal abscess should be opened through the mouth in the manner already described.

Rupture of Temporal Lobe Abscess into Lateral Ventricle With Recovery. In this case, reported by Goerdt,[6] the patient was a girl of 16 who had suffered from a double suppurative otitis media for four years,

(6) Archiv. f. Ohrenh., August, 1915.

and was brought in showing typical symptoms of a temporal lobe abscess which had been developing for several days. The operation was to have taken place within a few hours when she was suddenly taken with terrific head pains, change in purse-rate from 60 to 120, widely dilated non-reacting pupils, and collapse. Diagnosis of rupture into the lateral ventricle was made and operation performed at once. The mastoid was found unchanged but the tegmen was soft and on exposure the dura bulged. The dura was opened widely and the temporal lobe deeply incised, but no pus came until the wound was spread open by forceps. Three ounces of thick pus escaped, followed by a quantity of clear cerebrospinal fluid. Both fluid and pus, as well as the spinal puncture showed streptococci. A week later on account of symptoms of retention it was necessary to reopen the brain, but from that time on the recovery was uneventful.

This is the only case on record in which recovery took place following rupture into the ventricle prior to the opening of the brain abscess. These cases have always been fatal. They must be distinguished from the cases in which a fistula into the ventricle forms after the abscess has been opened and drained; in many of these the patients have recovered, as shown in the literature.

Otogenic Meningitis. After a thorough analysis of a large number of cases Mygind[7] reaches the following conclusions:

1. Not a few fatal suppurative leptomeningitis cases run their course without bacteria being found in the spinal fluid.

2. In the majority of cases polynuclear cells and bacteria are found, yet one is not justified in relying on these findings and excluding cases in which the sterile spinal fluid shows only cloudiness and contains only large numbers of mononuclears.

3. In young individuals the meningitis usually follows acute suppurative otitis media, in older persons it follows the chronic type as a rule.

4. The reports of cures are increasing in recent literature and many patients are reported cured with no operative interference except the spinal puncture.

(7) Zeitschr. f. Ohrenh., vol. 72, No. 2.

5. Great caution is necessary in the prognosis in all cases; when, despite operative interference, the disease progresses the prognosis is fatal.

6. The majority of cases occur between the ages of 15 and 30 (60 per cent.). The most unfavorable prognosis is in patients under 1 year of age and over 30.

7. Meningitis following chronic otitis media is less favorable than that caused by the acute form.

8. Statistics do not show that the presence of cholesteatomata makes the prognosis any less favorable.

9. Meningitis following labyrinthitis and post-operative meningitis are very unfavorable.

10. Mayer corroborates Alexander's finding that where the primary otitis is less developed the meningitis is more fatal and also that in otogenic meningitis mastoid changes are the exception.

11. The more cloudy the spinal fluid the more unfavorable the prognosis.

12. Cases in which the polynuclears are persistent in the spinal fluid are less favorable than those in which there are only mononuclears or the latter alternating with the former. Generally a change from mononuclears to polynuclears makes the prognosis less favorable and vice versa.

13. Sterile fluid is more favorable than bacteria-containing fluid; also a change from the former to the latter influences the prognosis unfavorably.

14. Streptococci give the worst prognosis, pneumococci the most favorable.

15. Opisthotonos and the Kernig sign may be marked in light cases and absent in severe cases. Temperature is of no prognostic value. Slow and irregular pulse is unfavorable. Herpes occurs equally as often in severe as in mild cases.

16. Of prognostic value are cerebral paralyses and deep coma. Choked disk and optic neuritis are a little more frequent in benign cases.

17. Of endocranial complications only cerebral and cerebellar abscess are of prognostic value as making the outlook gloomy.

18. Complications such as epiphlebitis, peri-sinus abscess, epidural abscess, pachymeningitis, external and

internal (where of course the sinus is not thrombosed), are among the more favorable complications. In three out of eleven such cases recovery ensued (30 per cent.).

All in all the prognosis is more favorable since operative measures have been instituted.

In the treatment, the only drug of value is hexamethylenamine (urotropin) given either by mouth or subcutaneously to the amount of a tablespoonful three times daily, but only for the first few days. Vaccine therapy is of no value.

The operative treatment may be (1) the simple cleaning out of the initial focus; (2) simultaneous craniotomy without incising the dura, and (3) the opening of the dura. In all cases it is necessary to investigate the sigmoid sinus. The indications for opening the dura and seeking for pus are (1) cases in which a fistula is seen in the dura, (2) gangrene of the dura, (3) deep pachymeningitis externa, (4) cases in which before operation there are clinical signs of cerebral or cerebellar abscess.

INTERNAL EAR.

Clinical Investigations Concerning Affections of the Internal Ear in Diabetes Mellitus. In this article Edgar[1] reports the following cases:

Of fifty-eight diabetics examined twenty-five had inner ear disease, namely: Eleven had inner ear disease from no other ascertainable cause; eight cases of inner ear disease showed also arteriosclerosis; one with inner ear disease showed also pulmonary tuberculosis; four cases of inner ear disease with lues and later arteriosclerosis; one case of inner ear disease with endarteritis following tobacco abuse. Of these patients, 70 per cent. had had diabetes a year or longer, 30 per cent. less than a year.

The symptoms observed were impaired hearing, subjective noises, and vertigo usually affecting both sides. In most cases the onset was slow. Diagnosis was made by functional testing which showed a short positive Rinné test, shortened bone conduction, perception for low tones almost normal, shortened hearing for high tones by air conduction. The course of the disease is slow,

(1) Monats. f. Ohrenh., April, 1915.

showing improvement as the sugar output is diminished. No special treatment is of any great value except possibly galvanism.

Edgar's conclusions are that there is an undoubted etiologic connection between diabetes mellitus and diseases of the inner ear as shown by the frequency of the affection in such cases and by the established fact that improvement of the ears follows a diminution of the excretion of sugar. His findings also lead to the conclusion that the diabetes produces disease of the inner ear as well as the acoustic nerve by a direct intoxication or toxemia of the labyrinth and nerves. In other cases the trouble may be attributed to arteriosclerosis of the blood-vessels of the ear which occurs so frequently in this disease.

Vestibular Findings in a Wound of the Frontal Lobe. Beck[2] reports a case of a bullet wound of the forehead (right side) 1½ finger breadths from the median line in which the patient became deaf in both ears, although the local aural findings were negative. The patient showed ataxic gait with tendency to fall backward and to the left. Also there was a spontaneous pointing error to the left. The right vestibule reacted very mildly while the left vestibule showed an over-irritability to the caloric and turning tests. All these signs pointed to a lesion of the left posterior fossa, *i. e.*, the side opposite to the wounded frontal. The patient developed fever lasting three weeks upon the subsidence of which the hearing improved and the vestibular reactions became normal. Inasmuch as the recovery of the aural apparatus was so complete and prompt Beck could not attribute the early acoustic and vestibular findings to any organic lesion of the posterior fossa (brain or nerves). Therefore they can only be explained, he thinks, on the theory of shock such as was the case in another patient reported by E. Urbantschitsch. The high temperature and its connection with the recovery of the hearing are as yet inexplicable.

Pathogenesis and Therapy of Otosclerosis. Denker[3] maintains that otosclerosis is primarily a bone disease

(2) Austrian Otol. Soc., June 25, 1915.
(3) Deutsch. med. Wochenschr., 1914, No. 19.

and that the mucosa changes often found are only accidental. He also believes that the hypophysis is in some way very closely related to the disease inasmuch as during pregnancy the cases become aggravated, due in all likelihood to the accompanying hyperplasia of the hypophysis. He states that otosclerosis develops in predisposed individuals through certain exciting conditions as in puberty when there is an acceleration in the bone development, pregnancy with its hypophyseal enlargement, possibly also in disturbances of the blood circulation as in arteriosclerosis, vasomotor neuroses, and syphilis. Clinically, he distinguishes three types: (1) localized changes about the round window with ankylosis of the stapes, (2) multiple foci of spongy bone formation throughout the labyrinthine capsule and degeneration of the membranous labyrinth, and (3) a combination of the other two.

As to therapy, he has faith in the phosphorus treatment and recommends phytin tablets or otosclerol; also, he says, hypophysin or pituitrin have yielded beneficial results. Furthermore, in pregnant women he recommends extracts of internal glands such as ovarian extract or spermin.

Auditory Neuritis. G. P. Wintermute[4] describes auditory neuritis as a disease coming on suddenly and, as a rule, producing tinnitus and deafness when the cochlear branch is affected; producing dizziness, vertigo, disturbance of equilibrium, spontaneous nystagmus and probably vomiting when the vestibular branch suffers; and a combination of these symptoms when both branches are involved.

The disease in the great majority of instances, is due to syphilis. Moran reports cases due to alcoholism. Large doses of some drugs such as quinine and the salicylates have produced it. In one case, the patient died a few days after the onset of the symptoms, and the post-mortem showed hemorrhagic nephritis, a degenerated liver and the brain cloudy (as seen in alcoholics). The neuritis has been due to toxemia from internal diseases. While toxic cases are occasionally seen, the great proportion of cases seen clinically are syphilitic, and with

(4) Jour. Amer. Med. Ass'n., Aug. 14, 1915.

the exception of the initial period it is found in all stages of syphilis, including the hereditary. The lesion in these cases is in the nerve itself, and not in the labyrinth, as was formerly supposed. It is a moot point, whether the central or peripheral neuron is first attacked. Microscopically, the nerve shows the ordinary degenerative changes of neuritis, with atrophy of its end organs.

The cochlear branch is the more vulnerable of the two. Consequently, the cochlear symptoms are the first usually to appear, and the last to clear up. Not only in the ordinary disease process, but in similar conditions caused by pressure, such as eighth nerve symptoms produced by intracranial pressure, the cochlear branch is first involved. So, too, the rule holds in drug toxemias when the cochlear usually is alone involved, and in tumors of the acoustic, tinnitus and impaired hearing show themselves before the vestibular symptoms come on. The disease may limit itself to the cochlear branch, in which event the patient escapes the much more distressing series of vestibular symptoms. The disease may affect the cochlear branch on one side, and the cochlear with vestibular branch on the other side. All possible variations are seen in the involvement and escape of the four branches of the two nerves, and in the time intervals between the onset in each branch. That is to say, between one branch being involved, and the disease limiting itself to this one, and all four branches becoming involved; cases may show the greatest variation, both in extent of involvement and in the intervals between the onset of each set of symptoms.

Tinnitus is the first symptom of affection of the cochlear branch to attract the patient's attention. It is abrupt in onset, and usually severe. It is greatest in the beginning of the disease, and grows less as destruction of the nerve proceeds. It is also constant, and not dependent on the pulse or position of the head. It is followed by loss of hearing, which also shows a wide variation in its extent. Hearing loss may be only partial or it may be complete. It is characterized, however, by its sudden onset, and also by the variation from day to day. When the infiltration of the nerve is great, many of the fibers are incapacitated by pressure, and the

patient hears badly; on other days the infiltration is absorbed, the pressure is reduced, and those fibers which are not degenerating recover their function, and the patient hears much better.

The shortness of bone conduction is a constant symptom. Even when the patient has fair hearing for conversation in the early stages of the nerve infiltration, the bone conduction will show a surprising shortness. Beck has noticed this in syphilitics who have no apparent ear symptoms; and he regards it as one of the signs of syphilis. The other functional tests in uncomplicated cases are those of nerve deafness. Weber goes to the side of the better ear; Rinné is positive; high-pitched notes are badly heard; low-pitched tones are, relatively to high, better heard.

The vestibular symptoms are much more distressing to the patient, and the alarm they cause him drive him at once into the physician's hands. He is very apt, however, when the cochlear branch is only slightly involved, not to associate them with his ear, and to seek aid from the general practitioner. Dizziness is of the labyrinthine type which causes the subjective sensation of the floor or ceiling revolving around the patient, and objects which he looks at moving. It is accompanied in severe attacks by vomiting, or at least by nausea, pallor, and, sometimes, perspiration. Spontaneous nystagmus is present, and is of the vestibular type, that is, rotary, combined with horizontal. The nystagmus is very apt to change its direction. When the patient looks to the right it may be to the right, and when he looks to the left it may change to the left. The gait suffers in proportion to the dizziness.

At the height of the attack the patient staggers to keep his balance, and even after the dizziness has become comparatively quiescent the patient suffers from a sense of insecurity in turning sharply around, or in walking in the dark. The attacks of dizziness come at intervals. Unlike inflammations of the labyrinth, in which the first attack is always the most severe, and from this climax the dizziness and corresponding vestibular symptoms taper off gradually in their severity, neuritis is apt to have one or two mild attacks preceding severe ones. These

symptoms in neuritis come in the form of attacks lasting usually for two or three days with intermissions in which the patient may be fairly comfortable. The Romberg sign is present at the height of the attack, and gradually diminishes as the other symptoms subside. The falling reaction follows the direction, as a rule, of the slow component of the nystagmus, in twisting the patient's head over each shoulder in the Romberg position. The spontaneous pointing error will vary with the nystagmus during the acute attack, but the error becomes less and less, and pointing is usually normal within a few days. The caloric reaction is usually lost during the stage when the vestibular nerve is thrown out of function, and so too, the turning reaction, as a rule, shows lack of irritability on the affected side; but it is almost characteristic of neuritis that the caloric reaction and the turning reaction show great variations. As a rule the turning reaction is first lost, followed by the caloric, but cases show variation in having one positive and the other negative. Again with all symptoms pointing to great loss of function in the vestibular branch, the ear may show extreme irritability to the caloric reaction. The labyrinth may be so irritable that in rare cases a positive fistula test may be obtained with, of course, the drum intact.

Aural Vertigo. Socca[5] has treated eighteen cases without any bad result, using fibrolysin or thiosinamin by hypodermic injection. He injects an ampoule (2.3 gm.) of fibrolysin solution daily for ten days, followed by a rest of ten days and then another series of ten daily injections. He believes that in less severe cases semiweekly injections are sufficient. Usually relief was obtained in most cases after two or three series of injections and he states that the results are far superior to any other known method of treatment. He attributes the results to the action of the fibrolysin on scar tissue as well as to some general anaphylactic action.

Concerning the Receptive End-Organ of the Ear. Zange[6] says that the generally accepted theory of hearing is based on Hensen's discovery that the basilar membrane

(5) Zentralb. f. d. Ges. Therap., January, 1915.
(6) Med. Klin., 1914, No. 8.

consists of 20,000 parallel fibers of varying lengths capable of responding to 20,000 different kinds of vibrations, resulting in the resonance theory of Helmholz and Hensen that we hear with the cochlea, each fiber responding to a different tone. This is corroborated by (1) finding certain remnants of hearing in deaf-mutes; (2) in nerve deafness with loss of hearing for high tones we find destruction of the fibers in the basal turn of the cochlea; (3) Wittmaack's experiments showing that prolonged irritation by a single sustained tone causes degeneration of a definite part of the membrane; (4) Munk's and Baginski's experiments on dogs where injury to the tip of the cochlea affected the hearing for low tones and to the base for high tones. Lucca claimed that people with completely destroyed cochleae could still hear, but his experiments on dogs were not convincing and on fish absolutely negative.

Injury to the semicircular canals does not always affect the hearing. Examination of deaf-mutes showed 42 per cent. of the cases where the canals were unharmed while Corti's organ was practically always destroyed.

"Is sound perception possible through the acoustic nerve fibers direct in the absence of the end organs?" There are cases quoted where the patient could hear whispered speech at 40 cm. that at autopsy showed complete destruction of Corti's organ. Ewald destroyed the labyrinth in a deaf woman and still was able to elicit some reaction to sound. Positive proof, however, is still lacking. The writer concludes that the cochlea is positively the chief functionating organ of hearing and that it is doubtful whether the vestibular apparatus or the nerve trunk can react to sound, although this has not been positively excluded.

Indirect Injury to the Acoustic Nerve. Zange[7] demonstrated two cases of gunshot wounds of the skull. In one the external auditory canal was wounded, the tympanic membrane and middle ear remaining intact; the symptoms were deafness and loss of the caloric reaction. In the other the bullet entered 4 cm. behind the mastoid and escaped through the nose. The symptoms were unconsciousness followed by total deafness on the affected

(7) Berlin. klin. Wochenschr., May 31, 1915.

side, escape of fluid from the ear, signs of intracranial pressure, double choked disk, and yet no paresis of the facial nerve or the other cranial nerves. In the absence of facial paresis the pyramid was assumed to have been unharmed except for a labyrinth fissure extending into the middle ear, and the loss of hearing attributed, at least in part, to indirect rather than direct injury.

Effect of Loud Noises on the Labyrinth. T. Ritchie Roger[8] reviews the recent experimental work and clinical investigations into the effect of loud noises on the labyrinth. He quotes Wittmaack, who experimented on animals, dividing them into four groups:

1. Six guinea-pigs were exposed to the continuous sound of an electric bell placed in the animals' wooden cage. After continued treatment the animals were killed at intervals varying from five to sixty days when the petrous portion of the temporal bone was fixed by a method he describes in detail and sections examined microscopically.

2. The next six animals were exposed to similar sound conveyed this time by both bone-conduction and air conduction, the cages being made of metal and the vibration being conveyed to the metal floor. This time the animals showed rapid wasting, whereas the intention had been to kill them at similar intervals to those of group 1, only the earlier ones recalled such interference as all were dead within sixteen days. The two last survivors were found sitting on the dead bodies of their companions in a vain endeavor to escape the vibrations conveyed through the floor of the cage. On examination after fixing as before, no change was found in the middle ear, but in the inner ear was seen a commencing degeneration in the nerve cells of the cochlear ganglia and of the nerve fibers of the ramus cochlearis and a commencing decay of Corti's organ. No change was found in the vestibular nerve or its end-apparatus.

3. Thinking that the absence of intermission of the vibrations might explain the severe constitutional signs, it was determined to approximate the next experiment to the conditions obtained in actual occupations and the noise was intermitted at night, the animals being ex-

(8) Jour. Laryngol., Rhinol. and Otol., March, 1915.

posed to the noise during the day time only. It was now found that there was no loss of weight—indeed, most of them put on weight, feeding well at night. Killed at intervals of from three to two hundred and fifty days afterward they showed the same changes as described in Paragraph 2.

4. Experiments were next instituted with noises of short duration, but intensive. Of these there were two sub-groups:

(*a*) Animals exposed to short intensive noises oft repeated. A shrill whistle was employed, a full blast being applied over a glass funnel at the animal's ear. As a rule, the animal sank immediately unconscious and remained so for some seconds, with complete relaxation, muscles and inhibition of sensation, but recovery was always speedy. This procedure was repeated daily or every second day and the animals were killed from three to thirty days after the first experiment. On examination no changes were found in the middle ear, not even rupture of the membrane. In the inner ear, no hemorrhage or tears of the delicate membranes or any such gross changes were seen, but definite changes similar to those already described, were found in the cochlear ganglia and nerves and in Corti's organ, varying in degree according to the date at which the animal had been killed. The degenerative process reached its highest degree in the lower part of the lowest turn of the cochlear, and in this region in the cases of the animals longest exposed, not even a spur of Corti's organ remained.

(*b*) In the second sub-group, the animals were killed at intervals of from one to sixty days after a single exposure to the blast of the whistle. The same results as above were noted, but very much slighter in degree and passing off gradually according to the length of time the animals were allowed to live after exposure.

Siebenmann[9] has demonstrated that it is possible to induce in animals the same pathologic changes in the internal ear which are produced in persons long exposed to loud noises. The lower part of the organ of Corti suffers first and most but the nerve in time undergoes degeneration over surrounding areas. The location

(9) Cor.-Bl. f. schweiz. Aerzte, March 28, 1915.

of the lesions in the cochlea varies according to the pitch of the sound as has been demonstrated on guinea-pigs. The most serious destruction followed a single blank cartridge shot close to the ear; Corti's organ and the peripheral half of the connected first neuron of the auditory nerve were thus severely injured at one stroke. Conditions resembling those in boiler making were realized by automatic hammering on the outside of a big iron tube with the guinea-pig inside.

Siebenmann further demonstrated that the inner ear suffers from loud noises only when the middle ear is normal. Whenever the middle ear was functionally deficient from an inflammatory process or removal of one of the ossicles, the labyrinth showed no appreciable injury from the loud sound experiments. This was particularly instructive when transmission by the middle ear was blocked in this way on one side; the labyrinth was not damaged, while on the other, the normal side, the acoustic trauma had caused pronounced degeneration of the epithelium of the cochlea. These facts confirm the assumption that sound waves do no damage unless they enter through the oval foramen. Hence the practical conclusion that in order to ward off harm from long-continued loud noises, all that is necessary is to keep the air waves out of the entrance of the ear. The animals whose ears were plugged with oil-soaked cotton or other air-free mass did not suffer injury of the internal ear from long-continued exposure to recurring loud noises. On the other hand, no preventive or attenuating influence was apparent from the use of thick felt, etc., under foot to deaden the sound. The transmission of sound by other routes than the middle-ear ossicles has slight if any injurious action on the organ of hearing, and all harm can be averted by thoroughly protecting the middle ear against sound waves by an air-free tight-fitting plug in the ear passage.

Labyrinthine Involvement Resulting from Infections in Mouth or Throat. G. E. Shambaugh[1] reports three cases of labyrinthine involvement resulting from local infections about the teeth or tonsils.

To account for the phenomena observed in many of

(1) Ann. Otol., Rhinol. and Laryngol., September, 1915.

these cases of internal ear disease as the result of focal infection we have only to assume that the endings of the eighth nerve may be the structure peculiarly susceptible to the bacteria liberated from the infected focus. Each fresh shower of bacteria liberated into the circulation produces a sudden depression of function, either in the cochlear or vestibular nerve endings, separately or in both simultaneously. With each attack, the patient experiences a defect in the hearing, associated with tinnitus aurium, when the cochlear alone is involved or there is a disturbance of equilibrium with vertigo resulting from the one-sided suppression of labyrinth tonus when the vestibular apparatus is involved. When both the cochlear and vestibular endings are simultaneously affected, we have as a result the complete picture of the Ménière symptom-complex—that is, deafness and tinnitus with vertigo.

A single attack may occasionally be severe enough to produce a total permanent suppression of function in the affected labyrinth. Here, in addition to the total deafness in the affected ear, there will be a severe tinnitus, which, diminishing gradually after the attack, may still require years before it entirely disappears. The vertigo occasioned by the sudden complete unilateral suppression of labyrinth tonus will be very marked, but will also gradually disappear, rarely lasting more than a few weeks or months. In such cases, in which the single attack causes a complete destruction of function in the affected labyrinth, there will, of course, be no subsequent attacks, unless the other ear should later become involved.

In most of the cases there is but a partial suppression of function resulting from a single attack. Here the deafness and tinnitus are most marked immediately following the attack, but neither disappears entirely, as a rule, even after a long period. The vertigo usually disappears rather promptly after a few days or weeks. In these cases of partial suppression of labyrinth function there will very likely be subsequent attacks, provided the focus of infection persists. In some cases the attacks with the Ménière symptom-complex persist at irregular intervals over several years, associated always

with an increasing loss of function. The attacks may cease only after the function of the affected labyrinth has been destroyed.

With this conception that the internal ear may be the target for a systemic infection of focal origin, we have at once a plausible explanation not alone for the chronic progressive character of the degeneration going on in the labyrinth, but also for the apoplectiform attacks with which these degenerative changes are so prone to be punctuated.

The possibility that some of these labyrinth cases of unknown origin may be caused by focal infection can not be denied. It behooves us, therefore, when examining these labyrinth cases of obscure origin, to make a careful search for foci of infection, just as we have learned to do in cases of rheumatism and allied conditions.

The focus for these systemic infections is usually found in the faucial tonsils or in abscesses around the teeth. When the tonsils contain the foci producing the systemic infection, there is very often a history of recurring attacks of acute tonsillitis. In some of the cases the patient will admit having recurring attacks of "sore throat," but denies ever having had attacks of tonsillitis. As a matter of fact, the recurring attacks of sore throat are usually mild attacks of tonsillitis, as can be readily determined by examining the pharynx during one of these attacks. It is, however, not uncommon to obtain no history of sore throat, and yet a careful examination will disclose unmistakable evidence in the faucial tonsil of chronic infection. In some cases this evidence is the presence of pus, which can be expressed from the tonsil. In others the congested appearance of the tonsil indicates clearly the presence of an infection. Such tonsils may be enlarged, but often they are distinctly shrunken and smaller even than the normal tonsil.

When the focus of infection is located about the teeth, it not frequently requires the use of the radiogram to discover the abscess.

Effect of Quinine or Salicylic Acid on the Spiral Ganglion. A series of investigations were made by

Schroeder and Hinsberg[2] in which different animals were poisoned with quinine, salicylic acid, and nicotine and others with cocaine, lead, morphine, strychnine, and cyanide. The animals were treated according to Wittmaack's method; the organs concerned were quickly removed and fixed in 96 per cent. alcohol and the staining done with toluidin or methyline blue. Examinations were made of the spiral ganglia, vestibular ganglia, and ganglia cells of the brain, cord, and trigeminus.

The results were as follows: Even in apparently healthy animals one may find slight changes in the cells of the character named by Nissl as "acute cell disease." Of the eight cases of quinine poisoning six showed normal condition of the spiral ganglia, yet in one of these six the vestibular ganglion showed acute cell changes and in several others there were slight changes in the cell of the anterior horn. Only two of the quinine animals showed changes in the spiral ganglia, the same being found also in the vestibular ganglia and in one case in both vestibular ganglia and trigeminus.

The salicylic and nicotine poisoned animals showed a similar result, namely that the spiral ganglia cells were not regularly nor exclusively affected nor any more severely injured than any other ganglion cells. Furthermore, the other poisons which are not classed as specific acoustic poisons showed similar actions. In twelve animals thus poisoned the spiral ganglia were in nine cases affected; besides, two of the other cell groups in every case showed degenerative changes, and in some cases they were all affected.

From these experiments it appears that there is no demonstrable distinction between the action of quinine or salicylic acid on the ganglion cells and that of strychnine, cyanide, cocaine or lead. The hearing and vestibular reactions were in some cases destroyed without there being any definite connection between this destruction and the ganglion cells.

(2) Zeit. f. Ohrenh., vol. 73, No. 2.

THE NOSE AND THROAT.

GEORGE E. SHAMBAUGH, M.D.

DISEASES OF THE NOSE AND THROAT.

DISEASES OF THE NOSE.

Headache Associated With Intranasal Disorders. L. H. Pegler[1] in a very interesting and instructive article describes the causes of headache from intranasal disorders. He presents anatomic charts showing the inter-relation of the various nerves, case histories which are very enlightening, and a very convincing exposition of his subject.

He classifies the causal factors as:

1. Pressure of rigid bodies within the nasal chambers.
2. Pressure from soft tissues with secondary effect on supporting structures.
3. Pressure from inflammatory conditions. Synechia often are the causal factor. Systemic conditions increase the severity of headaches.

That no definite location for the resulting headache is pathognomonic is quite well settled. The frontal region seems to be the seat most frequently.

One of the most frequent complaints for which a patient consults a physician, says W. Freudenthal,[2] is headache. The diagnosis of the cause is not complete without a thorough examination of the nose and sinuses. The nose does not, however, cause all headaches.

This author classifies headaches: (1) those entirely due to intranasal and nasopharyngeal disease; (2) those produced by several factors, one of which is situated in the nose and throat.

"As a general rule it may be said that when headache

(1) Lancet, Feb. 27, 1915.
(2) New York Med. Jour., Jan. 1, 1916.

is present on awakening, this speaks in favor of its nasal origin. When it occurs later in the day after using the eyes a great deal, it is attributable, probably, to some ocular affection. Another rule is this: If cocainization of the nose diminishes the headache its nasal origin is more likely, and this is also the case if it increases when certain diseased areas are touched with the probe. But these tests are not always positive evidence."

As to what may produce headache it may be said that every pathologic condition within the nose may be a factor. One of the most common is contact between the middle turbinate and septum, which irritates the sensitive filaments of the fifth nerve.

Disturbances within the sinuses either because of failure of ventilation or because of a suppurative process, are well-known. The localization of the headache is never constant for any of the several sinuses. Again there may be no headache with the severest pathologic condition in the nose.

Another common place, and one most frequently overlooked, is the nasopharynx. Freudenthal believes that by treating the nasopharynx by simple means practitioners would cure 50 per cent. of headaches.

[In ferreting out the cause for a headache it is very important that the rhinologist coöperate especially with the internist and the oculist.—Ed.]

The Relation of Diseases of the Nose and Throat to the General Practice of Medicine. H. Parrish[3] summarizes his article as follows:

"In all diseases of obscure origin with puzzling symptoms, make careful examination of the nose and throat.

"In all disturbances of the nose and throat, with no local conditions to account for the symptoms, seek the cause elsewhere; in the heart, stomach, kidney, nervous system, anywhere, and seek until you find. There must be an explanation somewhere. There is no effect without an adequate cause. Seek diligently for the cause and when you have found it, if possible, remove it, and when the cause is removed the effect will cease."

Nasal Reflexes and Neuroses. In this article atten-

(3) New York Med. Jour., May 15, 1915.

tion is directed by J. McLeod[4] to the rich nerve supply, both sensory and vasomotor, of the nasal mucous membrane; *e. g.* the nasal branch of the ophthalmic division of the fifth nerve, and the nasal branches from Meckel's ganglion; the latter are linked with the facial nerve and sympathetic by the pertrosal nerves. This explains the far-reaching effect of reflexes which may originate in the nose. McLeod states that he has never seen an asthma patient with a normal nose. In regard to hay-fever he points out that this malady shows marked preference for the educated, cultured and refined and rarely attacks the coarser elements of society.

An Interesting Case of Epistaxis of Syphilitic Origin. The case of a patient who complained of nose-bleeds, severe in character, and of three years' standing, is reported by G. A. Hinnen.[5] During this time five operations had been performed with no relief. All methods for controlling nose-bleeds had been used without result. The patient also complained of incontinence of urine for many months. There was nothing in his history suggesting lues.

Nasal examination showed a moderate hypertrophy of the left inferior and middle turbinates and a large septal spur. The right naris showed almost complete removal of the turbinates. Several ethmoid cells had been opened. Covering Kieselback's triangle there was a hemorrhagic exudate, appearing like a collection of small varicose veins, which seemed to extend through the septum. Merely touching the region would cause pronounced bleeding. Lues was suspected and the Wassermann test proved positive.

The patient was examined for enuresis and twenty-eight ounces of residual urine were found. The neck of the bladder showed a peculiar trabeculation.

Antisyphilitic treatment was instituted. Iodides and mercury were given. The galvano-cautery was applied to the nasal lesion. In four weeks the patient had no further trouble. Five months later, he was in excellent condition.

---

(4) Universal Med. Rec.; abstracted in Western Med. News, June, 1915.
(5) Lancet-Clinic, July 31, 1915.

Operative Treatment of Hard Fibroma or Fibrocarcinoma of the Base of the Skull. This author, R. Neuenborn,[6] remarks that cases are on record in which nasopharyngeal fibromata have disappeared spontaneously. He says that until very recent years the general surgeon has attacked these tumors by various methods. Neuenborn holds that it is very questionable whether the operation is not more dangerous than the tumor itself. He has had eleven such patients and has operated on none.

Neglect of Injuries to the Nose from Football. D. B. Delavan[7] calls attention to the resultant deformities and the after-effects of severe injuries to the nose received while playing football, and suggests that such injuries be not considered lightly. Proper attention should be paid to the injury within a few hours if the best results are to be obtained.

Histologic Pathology of the Nose. J. C. Beck[8] has produced some interesting and valuable photomicrographs of pathologic conditions within the nose.

In dealing with pathologic conditions of the inferior turbinate it is pointed out that one sees manifold changes in the soft tissues, the bone being rarely changed. It is noteworthy that macroscopically the changes appear the same but histologically they present quite different pictures. Hypertrophy may take place in the connective, mucous glands, vascular and epithelial tissues, and bone. Most specimens show the connective tissue hypertrophy, the glands and blood-vessels are frequently destroyed by pressure. In chronic suppurative sinusitis the epithelium is markedly hypertrophic, usually presenting in folds which appear under the microscope like channels or lakes. (Plate VIII). The mulberry enlargements of the posterior end of the inferior turbinate are principally connective tissue covered with thick layers of epithelium. (Plate IX.)

In chronic intumescence of the inferior turbinate the connective tissue predominates. It is usually very

(6) Zeitschr. f. Laryngol., vol. 6, No. 6.
(7) Med. Record, Nov. 6, 1915.
(8) Ann. Otol., December, 1914.

edematous showing a marked increase in newly formed blood-vessels, and a round-cell infiltration in and just beneath the epithelial layer (Plate X).

Beck prefers to conserve as much functioning membrane as possible when dealing with pathologic conditions of the inferior turbinate. Instead of amputating he uses a crushing operation with his own conchotribe (V. Mueller) which gives very satisfactory results: *i. e.*, the tissues shrink down allowing good drainage and breathing space.

Post-operative fibrinous casts within the nose, everyone has observed and no satisfactory explanation has been offered for the occurrence, except using the vague term "reaction." Beck has found very few bacteria in such casts. The best way to handle such a complication is to leave it alone. If the cast is removed mechanically it recurrs quickly, if it is treated, for instance, with argyrol the condition lasts longer than when it takes its own course and is dislodged.

Pathologic specimens of the septum, bony and cartilaginous, show changes not unlike those described by Siebermann in otosclerosis. Great activity in growth of the cartilage and bone are seen at their junction. Textbooks usually point out that there is an absence of blood-vessels in the cartilage but Beck shows in Plate X that there are blood-vessels in the cartilage.

[Beck does not show a specimen which might clear up the question as to whether or not the cartilage reforms after a septum operation.—Ed.]

Experimental Studies of the Effect of Various Atmospheric Conditions on the Upper Respiratory Tract. Apparently, says G. H. Cocks,[1] there is considerable diversity of opinion among sanitary engineers and hygienists as to what constitutes proper ventilation. There appear to be no fixed standards representing good ventilation, though engineers claim to be able to meet any condition so far as the mechanical end of the proposition is concerned.

Up to the present time, we are relatively certain that we can discard the chemical constituents of the air as of no great importance and it has been demonstrated that

(1) Laryngoscope, vol. 25, No. 9, p. 603.

the amount of carbon dioxide and oxygen may vary between wide limits without producing physiologic effects. The effects of improper ventilation can no longer be explained by the presence of volatile organic poisons in the air.

"The tendency at the present time seems to be to explain the physiologic effects of the air on the human body in terms of the physical influence exerted, the principal factors being temperature, humidity and air movement."

Considerable experimental work has been done along these lines which has tended to show conclusively that various atmospheric conditions do effect the economy of the organism, *e. g.* exposure to cold lessens the resistance to infection. Pasteur found that by immersing a fowl's feet in cold water over-night it became susceptible to anthrax, whereas under ordinary circumstances it was not. Lode, Fischel and Durck have shown that shaving the bodies of guinea-pigs and rabbits and then subjecting them to cold, made them more susceptible to infection, and in turn less resistant. The lowest temperature at which animals may be exposed without changing or affecting their resisting powers, has not been accurately worked out.

The physiologic effect seems to be a vasomotor change.

Chodounsky believes that respiratory diseases are entirely a matter of infection and that exposure and atmospheric conditions do not enter into the process.

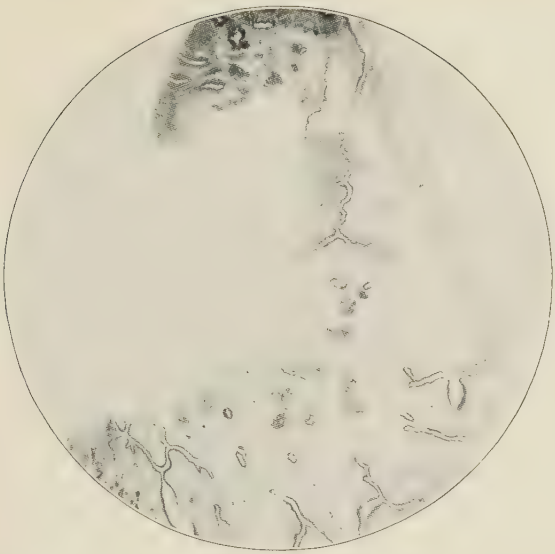
Other observers explain changes on a physico-chemical basis.

It is plain to be seen that as yet there is no real explanation for the changes occurring under various atmospheric and thermic environments.

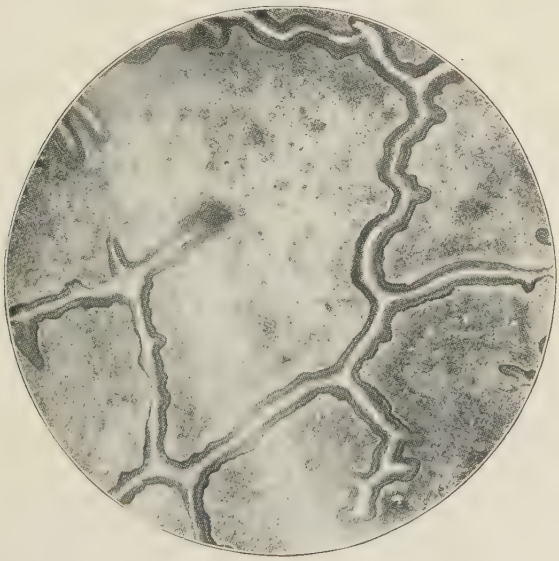
Cocks and his co-workers have attempted to add something to the knowledge of the present time and were fortunate to be able to work under very favorable conditions.

The clinical examinations of the nasal interior were substantiated by use of an improved Glatzee mirror, the records being accurately recorded.

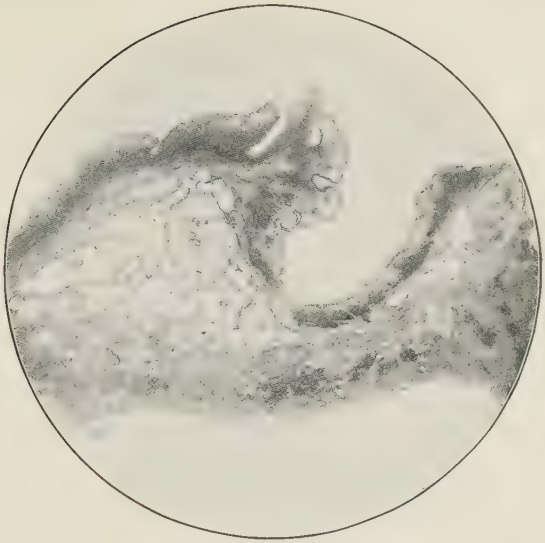
The following table of temperatures and degree of humidity was used as a working basis:



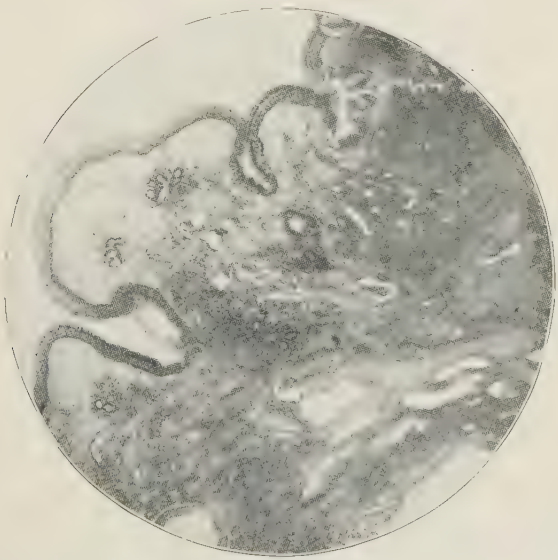
Hypertrophy of the inferior turbinate body. Mucous membrane showing great epithelial hypertrophy with folded-in masses.—Beck.



Same as above, under higher power, showing epithelial lakes.—Beck (see page 262).



Papillary hypertrophy of the inferior turbinate body, showing bone and cartilage hypertrophied, with considerable rarefaction. —Beck.



Same as above. Very marked thickening of the epithelium of the papilla.—Beck (see page 262).

PLATE X.

A. Chronic intumescence of the inferior turbinate body. Marked inflammation of the surface epithelium. New blood vessels. Almost complete atrophy of all the glands.
B. Same as A, under higher power.—Beck (see page 262).

Normal	68°	Fahr.	temp.	50%	relative	humidity
Cold	50°	"	"	50%	"	"
Hot dry	80-86°	"	"	20-30%	"	"
" moist	80-86°	"	"	80%	"	"
" medium	80-86°	"	"	50%	"	"

Summary and Conclusions: "Our clinical experiments demonstrate that distinct changes in the mucous membrane of the nose result from changes of air temperature and humidity. In the majority of instances the reaction is one of increased swelling, moisture and redness from heat, and the reverse from cold.

"The effect of air blown directly upon the face by fans greatly modifies the changes observed. On going from the cold to the hot room with fans, there is a decrease in the size of the inferior turbinate and in the amount of moisture. The characteristic change on passing from the hot to the cold condition with fans, is an increase in the turbinates and secretion.

"It was further observed that moist heat produces greater changes than dry heat, while the highest percentage of cases of atrophic rhinitis was found among long-time workers in hot, moist rooms (steam laundries).

"The window and foot-bath experiments tend to show that the reaction of the nasal structures to atmospheric changes is primarily direct and local and not reflex, although the evidence on this point is inconclusive.

"It must be remembered that turbinate reactions are very delicate, and that changes we have observed are by no means constant. It would appear, however, that the reactions in the nasal mucous membranes produced by changes in atmospheric environment are too frequent and too definite to be disregarded. Consequently, we are convinced that the theory of bacterial infection as the sole cause of catarrhal inflammations of the upper air passages is not tenable, since the changes produced by environment must materially affect the incidence of infection."

[Along these same lines it has been shown by Hubbard that a mean temperature of 65° Fahr., with a relative humidity of from 40 to 50 per cent. is the most practical and healthful. He shows that from an economic standpoint the cost of heating to a temperature above 65°

is not much less than heating up to 65°, in other words it costs nearly twice as much to maintain the room temperature at 78° for instance, as it does to heat from zero up to 65° as a constant temperature. *A priori*, it may be said that the Americans are about the only people who require such warm quarters to live in.—Ed.]

Correction of Saddle-Nose. The author, E. Eitner,[3] has sought to discover a method for correction of external nasal deformities, especially saddle-nose deformities. He empirically divides cases of saddle-nose into three classes: (1) congenital; (2) traumatic; (3) leutic.

He calls attention to the fact that many severe external operations have been tried in times past and then abandoned for the simpler method of injecting paraffine. This method has not proved satisfactory in all cases. Later cartilage transplants were used and at first this seemed successful but after from three months to over a year the patients returned with the deformities again present; in some they were worse because the transplant had changed its position.

After the removal of several of the transplants, examination showed that the substance of the cartilage had gradually been absorbed and that the periosteum for the most part was intact. A heterogenous transplant such as ivory was tried with success, and is now used in all cases with good result. It was found to cause less reaction and could be sterilized so thoroughly that the cases seldom were infected.

The Technique: The technique does not differ greatly from other operations of the same nature. The root of the nose is infiltrated with novocain and an incision made on the outer wall within the nostril, and the structures are raised up and away from the bone. The transplant is then inserted. The incision is sutured and the nostril tamponed for a few hours in order to control secondary bleeding.

Eitner has operated on eighty-six such patients with satisfactory results. If the first transplant is not sufficient for a good nose, after an interval of six or eight weeks a second transplant may be used, although in

(3) Deutsch., med. Wochenschr., July, 1915.

Eitner's cases some difficulty was encountered with the scar tissue. *X*-ray pictures are shown with the ivory in position after some months' observation.

Hypophyseal Growth Operated on Through the Nose and Sphenoid. In this case, reported by O. J. Stein,[4] the diagnosis of hypophyseal tumor had been made by Dr. Suker from his examination of the eyes. The *x*-ray pictures showed a marked involvement of the sella turcica. The patient, a woman, complained of severe headaches, attacks of vertigo, and loss of vision.

Stein used the technique of Hirsch, *i. e.* he approached the region through the septum. On opening into the skull the patient collapsed. No complication resulted and she left the hospital in seven days much improved. The vision gradually improved, and the headaches and vertigo disappeared.

[Stein showed the patient to the Chicago Laryngological Society in December, 1915, at which time there were no signs of recurrence.—Ed.]

Radium in Rhinoscleroma. J. Guttman[6] reports the following case of rhinoscleroma treated with radium:

J. M., aged 26, the mother of two healthy children; family history negative. She knew of no one suffering from a similar affection. She was a native of Hungary and came to this country eight years ago. Her present illness dated back sixteen years. She had been operated on by different physicians in different dispensaries without the slightest improvement.

When she came under Guttman's care she showed almost complete occlusion of both nostrils by a mass of hard fibrous connective tissue. The nasal apertures were replaced by openings barely the size of a pin. The alae nasi were considerably harder than normal. In the pharynx in the region of the posterior pillar there was a hard white patch. Post-rhinoscopic examination showed considerable purulent secretion, probably due to impeded drainage anteriorly. The laryngeal surface of the epiglottis was covered with a small white patch. The superficial cervical glands were indurated on both sides. Wassermann reaction was negative. A section removed

(4) Laryngoscope, March, 1915, p. 159.
(6) New York Med. Jour., Oct. 2, 1915.

from the introitus naris showed Mikulicz cells containing a few diplobacilli of Frisch.

For four weeks the patient was treated with radium, with marked improvement. At the time of writing, however, it seemed that to obtain a complete cure, the treatment with radium would have to be continued for several months.

The Etiology and Treatment of Ozena. The subject of the etiology of ozena has been worked on for years by different observers in various parts of the world. As is well known, the disease is far more common in Europe than it is in America.

Every specialist, however, has one or more such cases a year; and, as a usual thing, a general lack of knowledge on the subject, combined with the general pessimistic view of the results of treatment, causes him to slight or probably not treat the case at all.

According to Henry Horn[7] in an excellent paper on the subject such an attitude is now no longer defensible. In properly prepared vaccines we have a potent factor for vast improvement. We can promise not only that the odor will disappear but also that the formation of crusts will be reduced to a minimum.

In this paper no other form of atrophic rhinitis, syphilis tuberculosis, etc., is mentioned. He deals only with the typical clinical picture of ozena, which is familiar to all rhinologists.

Stripped of all unnecessary details, the method of isolation employed by Horn is as follows:

A crust is taken from the nose, preferably at the anterior end of the middle turbinate. This is dropped in a bouillon tube and incubated for 12 hours. Incubation is a very important point, for it has been found that a lesser period does not give the organisms time to grow, and an incubation of more than twelve hours causes such an over-growth of the accompanying organisms that isolation of the Perez bacillus is impossible.

At the end of twelve hours, one drop from this bouillon tube is spread over from three to five agar Petri dishes. These are incubated for twenty-four hours, and then the

(7) Jour. Amer. Med. Ass'n., Aug. 25, 1915.

separate colonies are fished and transferred to agar slants.

In fishing for the colonies a great deal of experience and judgment is necessary, those conforming to the characteristics of the staphylococcus, *Micrococcus catarrhalis,* streptococcus, *Bacillus proteus* and other well-known forms are not transferred. There is nothing characteristic about the colonies. They are usually small, moist and transparent.

After twenty-four hours on agar slants, a characteristic odor is usually developed by which the organism can be fairly well identified. There is also nothing characteristic of the slant growth, the pure culture looking much like ordinary staphylococci. The presence of a marked odor is very variable. It is not the marked sickening odor of ozena in the patient, but a milder, though still characteristic odor.

Horn found that the intravenous injection of live cultures in very large doses will kill rabbits in from twelve to twenty-four hours, the only necropsy finding of any consequence being the selective action of the organism on the mucous membranes of the turbinate bones of the nose.

In smaller doses, intense congestion, first of the anterior turbinate and later of the posterior turbinate, can be brought about. If this process is allowed to continue, pus forms in and about the turbinated bodies, finally entirely blocking up the nares.

In some of the rabbits which withstood the large dose for a comparatively long time, marked atrophy of the turbinates was noted.

Horn states that the various strains of the Perez bacilli vary extraordinarily and are difficult to preserve. They must be carefully protected from heat and light. For the best results, careful watch must be made for the constitutional symptoms, which are less marked with old vaccines than with those freshly prepared.

The clinical manifestations are the best guide to dosage and a period of at least one week should intervene between injections. The dose varies with every vaccine and every patient. An initial dose of 50 million, doubling

until the proper constitutional symptoms develop is about correct.

The general reactions are rise of temperature, loss of weight, malaise and vomiting. The local reactions are redness and swelling around the injection and swelling of adjacent glands. Symptoms referable to the nose are coryza, free discharge from the nose, sensations of heat and fulness over the bridge from the mucous membrane.

These local reactions in the nose are what we should endeavor to produce if the full effect of the vaccine is desired. As a usual thing, the patient is instructed not to douche the nose until it becomes absolutely necessary; in this way, a good idea of the amount of improvement can be gained.

Notes should be kept on: (1) the intensity of the odor; (2) condition of the accessory sinuses; (3) condition of the crusting, and (4) the improvement in subjective symptoms.

The improvement is usually noted by the patient after the first dose. There is improvement in the degree of odor. The crusts blow out more readily, and the feeling of tightness across the forehead is improved. From five to fifteen injections are considered necessary for a complete cure, and the patient must be carefully watched for a relapse, when the treatment should again be instituted.

Horn draws the following conclusions:

1. The *Coccobacillus foetidus ozaenae Perez*, as isolated by Hofer, has answered all the bacteriologic requirements necessary to establish its identity as the etiologic factor in ozena.

2. The isolation of this organism is attended with considerable difficulty.

3. The production of agglutinating serum in rabbits is an exceedingly difficult task.

4. The preparation of autogenous vaccines in every case is very difficult, if not impossible.

5. At present mixed vaccine made from various strains of the Perez bacillus is the most practical method of treatment which is now available.

6. It may be necessary to precede or combine with the treatment the vaccines made from the organisms

which are usually present in combination with the Perez bacillus.

7. It may be possible that there may be two or more types of ozena bacteriologically different but clinically identical.

Nerve Blocking—Injection of the Sphenopalatine Ganglion in Some of the Commoner Diseases of the Nose. Harry L. Pollock[7] suggests the use of sphenopalatine injections in hay-fever, sphenopalatine neuralgia, hyperesthetic rhinitis and post-operative neuralgia.

The technique of the injection is as follows: The posterior end of the middle turbinate and nasal wall just posterior to it is obtunded with a 20 per cent. solution of cocaine. Neuralgia cases usually show immediate relief after this procedure, and this incident predicates a favorable result for the injection. Then a sword needle (Sluder) 5¼ inches long is employed. The needle is introduced from the septal side of the nose, transfixing the posterior end of the middle turbinate, after which it is pressed gently through the turbinate until the posterior wall is felt. The needle is then pushed upward, outward and backward, through the bony wall, which is the interior boundary of the sphenomaxillary fossa, in which the ganglion lies surrounded by connective tissue. Usually, by tactile sense, the operator feels the needle slip into the cavity. The ganglion is about 0.66 cm. back of the wall. A 5 c.c. Luer syringe, filled with a 2 per cent. solution of phenol (carbolic acid) in alcohol, is then attached to the needle, and from 5 to 15 minims of the solution are injected. If the needle succeeds in penetrating the ganglion, the patient complains of excruciating pain in the eye, ear, top and back of head and into the shoulder; but should the phenol-alcohol solution merely surround the ganglion, the pain is less severe.

The pain usually lasts anywhere from a few minutes to twenty-four or forty-eight hours, and it is in cases in which the pain is most prolonged that the end-results are most gratifying. If the ganglion is injected the first time this usually suffices for a cure. Frequently further injections at short intervals are required; never more than four. In cases of neuralgia only the sphenopalatine

(7) Illinois Med. Jour., May, 1915.

ganglion is injected. In hyperesthetic rhinitis and hay-fever it is advisable to inject the nasal branch of the ophthalmic nerve as well. This can be done successfully by first obtunding the extreme superior anterior angle of the nose where this nerve first enters the nasal cavity, and then injecting a few drops of the solution at this point. There is comparatively no danger associated with these procedures if done under strictly aseptic precautions.

Vaccines in Respiratory Diseases. The series reported on by Rowlette[8] consists of fourteen cases: Chronic nasopharyngeal catarrh, four; recurrent acute nasopharyngeal catarrh, four; recurrent acute general catarrh with bronchitis, three; chronic bronchitis, two; and pulmonary abscess, one. The four cases of chronic nasopharyngeal catarrh were of long standing, and all the patients had undergone local surgical treatment of various kinds. The infections were: in one case pneumococcus, in one pneumococcus and *Micrococcus catarrhalis*, in one streptococcus, and in one *Staphylococcus aureus* and streptococcus. The dosage employed was pneumococcus, 10-60,000,000; *Micrococcus catarrhalis*, 50-200,000,000, streptococcus, 10-25,000,000; and *Staphylococcus aureus*, 50-500,000,000. The number of injections varied from six to eighteen. The results in three of the cases were entirely satisfactory; in the fourth the treatment had no effect.

Four cases of acute recurrent nasal catarrh were treated. In two the infection was of *Micrococcus catarrhalis*, in one of streptococcus, and in one *Staphylococcus aureus*. Of the three cases of acute recurrent general catarrh, two were infections of *Micrococcus catarrhalis* and one of a staphylococcus. Rowlette has treated only two cases of chronic bronchitis, one with *Micrococcus catarrhalis* and one with streptococcus. He does not think that either case was benefited to any appreciable extent, but in neither case was a sufficient trial given.

Taking his series as a whole, in ten of the fourteen cases treated the result was very satisfactory; in one there was a temporary improvement, and in three no result could be traced.

(8) Lancet, June 26, 1915.

Classifying the cases treated according to infection, the results are as follows: *Micrococcus catarrhalis* five, patients of whom three became quite well, one was benefited; pneumococcus two, both became well; staphylococcus one, became well; streptococcus three, of whom two became well and one was unaffected; streptococcus and staphylococcus two, both became well; *Staphylococcus aureus* one, became well.

Effects of Protein Extracts, from Fruits and Pollens, on the Upper Air Tract. In this article W. F. Chappell[9] calls attention to the fact that in some people who suffer from a variety of local irritations of the mucous membrane of the nose and throat and external auditory canal, the causal factor can be attributed to eating certain fruits and drinking certain wines.

Raw apples cause the greatest trouble in the greatest number of cases, but one may be anaphylactic to several fruits. Cooked fruit greatly modifies the reaction.

By producing protein extracts of various fruits, the author and his co-workers were able to produce symptoms by vaccination in susceptible cases, comparable to the anaphylaxis seen in other conditions under similar circumstances.

[The work is only a preliminary report at present, but it seems promising.—Ed.]

The Use of Kaolin to Remove Bacteria from the Throat and Nose. Hektoen and Rappaport[1] have found that, when properly applied, kaolin in the form of a dry powder removes not only diphtheria bacilli, but also practically all other bacteria from the nose in the course of from three to four days. For this purpose, the kaolin is blown into the nose six or seven times a day at two-hour intervals by means of a rubber bulb attached to a glass tube, the free end of which tapers a little. The insufflation is repeated several times at each treatment. The success of this treatment appears to depend largely on the free and thorough distribution of kaolin over the nasal surfaces. In cases of more or less obstruction of the nasal passages, the removal of bacteria by kaolin insufflation is more difficult.

(9) Trans. Amer. Laryngol. Soc., 1915.
(1) Jour. Amer. Med. Ass'n., June 12, 1915.

In order to secure the most thorough application of kaolin to the mucous membrane of the throat, patients, if old enough, are instructed to swallow as slowly as possible one-third teaspoonful of kaolin four or five times an hour during the day. In the case of adults and older children who are anxious to get rid of diphtheria bacilli, this method, which has been selected after trial of several others, involves no special difficulty. In the case of small children, it is more difficult to apply enough kaolin, and the plan of mixing the koalin with sugar in the form of tablets is being considered. In a number of cases, in some of which there were a great many diphtheria bacilli in the throat, complete and apparently permanent removal has been accomplished by means of kaolin in the way described in from two to four days, the throat to a large extent being freed from all bacteria.

Scopolamine in Throat and Nose Operations. Myron Metzenbaum[2] advocates the administration of scopolamine to modify or control the delirium of the excitation stage in ether anesthesia.

Adults receive 1/100 gr. usually by mouth, or it may be given hypodermically from one-half to one hour preceding all operations under local or general anesthesia.

Children are given a 1/200 gr., coated pill with a little water, from one-half to one hour before operating. In children the drug is only given by hypodermic when the immediate effects are required and morphine is never combined with it.

Scopolamine acts as though it were made up of two radicals, one being similar to atropine or belladonna. Since children tolerate belladonna very well, this may explain why they tolerate scopolamine.

The atropine radical, like atropine itself, prevents reflex inhibitory stimuli coming through the superior laryngeal nerve and its branches to the vagus. It is of value, therefore, if given before operations for the removal of adenoids, tonsils or operations around the base of the tongue, thyroid gland or larynx, in bronchoscopy, esophogoscopy and especially in removing foreign bodies from the pharyngeal or laryngeal region when there is considerable traction of the tongue.

(2) Cleveland Med. Jour., April, 1915.

The atropine radical does not check the secretion of the kidneys, but it holds in check the mucous during ether anesthesia.

In bronchoscopy there is almost no secretion to wipe away.

In operations with local anesthesia on the throat there is almost no saliva to annoy. In operations on the nose the abundant nasal secretion is lessened and the usual profuse discharge following any extensive nasal manipulation in operation is held in check for several hours.

The other radical of scopolamine is a decided brain sedative, for after the administration of a physiologic dose of scopolamine the pre-operative nervous fear and irritability is changed to one of calm and quietude, so that when desirable the patient may be placed directly on the operating table without manifesting the usual fear and excitement. Scopolamine places the patients under a mild anesthesia, therefore in administering ether or nitrous-oxide-oxygen-gas they go under the general anesthetic more rapidly, with less resistance, requiring less anesthetic to maintain an even anesthesia, and awakening more rapidly, at the same time the anodyne effect lasts for several hours. In nitrous-oxide-oxygen-gas, scopolamine renders greater muscular relaxation at the same time gives a better vasomotor tone.

In operations on the nose and throat under cocaine or novocaine the preliminary administration of scopolamine is of the greater value. The usual fretful, excited, restless patient becomes quiet, interested and helpful, so that in the removal of tonsils or foreign bodies from the throat the patient will often hold the tongue depressor and be entirely free from the usual constant desire to spit, cough, gag and explode the breath.

In nasal operations, the preliminary administration of scopolamine lessens the amount and strength of cocaine or novocaine required, and anesthesia of the bony areas is decidedly more effective, as in the opening of the antrum or sinuses.

When scopolamine is administered in physiologic doses it seems free from any immediate or remote detrimental effects, while its benefits are to quiet the patient, benumb his sensibilities and lessen his irritability to such a degree

that he requires less local or general anesthesia to complete the operation.

Technique of Analgesia in Intranasal Surgery. The method employed by W. Watson[3] for the production of local anesthesia of the nose is as follows:

"One hour before the commencement of the operation a hypodermic injection of ¼ grain of morphine with 1/100 grain of atropine sulphate is given and the nasal passages packed with gauze soaked in equal parts of 10 per cent. cocaine and adrenalin. This should be done with reflected light, so that narrow strips can in most cases be passed behind a marked deviation. The patient should be allowed to remain as quiet as possible for thirty minutes, when he is tranferred to the operating table and the gauze strips are removed, a small portion of cotton-wool being inserted far back in each nostril to soak up any overflow from the following infiltration of urea-hydrochloride-quinine solution. In the case of an operation on the nasal septum three points for injection will suffice on each side; these points are at the angles of a triangle with the base corresponding to the junction of mucosa and skin just behind the anterior nares and the apex over the vomer, its exact position being dependent on the area infiltrated by the two injections in front. If the inferior turbinals are to be removed two injections will suffice on each side, one just behind the anterior extremity and the other at the junction of the middle and posterior thirds. The syringe employed should be all metal and the needle of the finest aperture procurable with bevelled tip without point. Dental needles are most convenient. The solution employed should be 1 per cent. quinine-urea-hydrochloride, and the amount injected should not be stinted. The nose is again packed with gauze wrung out of the cocaine-adrenalin solution, and in about twenty-five minutes the operation is commenced."

Watson maintains that the hemostasis is perfect, and the analgesia is so thorough as to be truly anesthesia, even the tectile sensibility being in most cases destroyed.

The Inferior Turbinate. J. A. Cavanaugh[4] deprecates

(3) Brit. Med. Jour., June 26, 1915.
(4) Ann. Otol., September, 1915.

the unsurgical slaughter of the inferior turbinate. The removal is not a panacea for relieving all or any nasal obstruction. When correction of the septum is performed, under ordinary circumstances, the turbinate which is usually of the turgescent type, will take care of itself. The use of the chemical cautery is unsurgical. The electric cautery is permissible when used with discretion. A submucous operation of the turbinate when there is hypertrophy of the bony portion gives very satisfactory results, besides conserving the functionating membrane.

[This article is a timely warning for those who practice, without compunction, at least with no hesitancy, removal of this valuable nasal structure. As much can be said relative to the destruction of the middle turbinate. —Ed.]

The Early Recognition of Cancer of the Nose and Throat. After briefly reviewing the subject of cancer of the nose and throat Emil Mayer[5] states that the early recognition of cancer in the upper air passages is of vital importance, as in many instances this recognition not only alleviates suffering, but is followed by complete cure, hence all these cases should be seen by someone who has made a study of diseases of the upper air passages, and who has made himself master of that most difficult and most important part of the treatment of all illnesses—diagnosis.

Infections of the Upper Air Tract. R. L. Cecil,[6] after a careful study of infections of the upper respiratory tract concludes that "colds," in persons who are susceptible, usually have one bacterium as the etiologic factor. Mixed infections are not the rule. He advocates prophylactic vaccination in such cases.

Hay-Fever.

The Treatment of Hay-Fever with Calcium Salt. H. Wilson[7] reports the result of calcium chloride treatment in a series of twenty-six cases. Twenty-two patients were

(5) Amer. Jour. Surg., July, 1915.
(6) Laryngoscope, February, 1915.
(7) Jour. Amer. Med. Ass'n., March 4, 1916.

treated exclusively with this salt and in four it was administered after symptoms developed following a pollen solution course of treatment.

Emmerich and Loew were the first to suggest this particular treatment on purely empirical basis.

It is suggested by Wilson that the treatment begin several weeks previous to the time when the symptoms usually become manifest.

The prescription generally used was:

℞
Calcium chloride, crystals.....100 gm.
Distilled water .....ad. 500 c.c.
Dissolve
Take one teaspoonful in sufficient water during or after meals.

Occasionally a patient could not withstand such a dose, but the dose can readily be adapted to the patient's particular needs.

The author concludes as follows:

1. Some hay-fever patients taking not less than 3 gm. of calcium chloride daily, even for a short time, are practically relieved from all hay-fever symptoms.

2. Calcium chloride may be taken in doses of 3 gm. daily for an indefinite time without any apparent injury.

3. It is not indispensable in all cases for a hay-fever patient to take calcium chloride over a long period of time in order to secure relief.

4. Calcium salts may be given, even when the nature of the patient's sensitization is not known.

5. The clinical results from the administration of calcium chloride in cases of hay-fever are such as to warrant its further trial.

Hay-Fever: Its Cause and Prevention. As president of the American Hay-Fever Prevention Association, W. Scheppergrell[8] should be able to speak authoritatively upon the subject.

Under the heading "Etiology," he says that the plants which form the type of hay-fever producing weeds are the common ragweed *(Ambrosia artenusiaefolia)* and the giant ragweed *(Ambrosia trifida)*. Pollen is produced in great abundance and easily dislodged and disseminated

(8) Jour. Amer. Med. Ass'n., March 4, 1916.

by wind. The weed grows luxuriantly in some form all over the United States, less so, however, in the West. Altitude does not influence the growth it seems, so hay-fever is frequent wherever the weed is found.

The author concedes that there is much to be desired in our knowledge of this subject but that the association is making an effort to put it on a scientific basis.

Pollen Extracts and Vaccines in Hay-Fever. In the summary of results obtained by S. Strause and I. Frank,[9] they say that 64 per cent. of the patients receiving vaccines and 70 per cent. of those receiving pollen extracts apparently had a milder season than previously. Vaccine therapy seemed to give equal or better results than pollen extracts in the individual cases. Four patients receiving the combined treatment were apparently cured for the season.

[This is a very honest report, no case having been thrown out for any reason.—ED.]

THE SEPTUM.

Two Cases of Depressed Nasal Deformities Resulting from the Submucous Operation. The patients were seen by W. W. Carter[1] one and one-half and two years post-operatively. Examination showed that the upper edge of cartilage where it should be wedged in between the two lateral cartilages had either been dislocated or removed from that position. Carter advocates in septum operations: First, relief of obstruction by use of punch forceps; second, intranasal cosmetics should be considered of secondary importance.

He further states that he is seeing more and more of these cases every year, and that the defect is reparable only by use of bone transplants.

Reconstruction of the Nasal Septum. The conclusions reached by J. A. Babbitt[2] are:

"1. A submucous resection, properly and completely done, will reconstruct a perfect, functional septum.

"2. If a careful superior margin be left, even with

(9) Jour. Amer. Med. Ass'n., March 4, 1916.
(1) Med. Record, May 15, 1915.
(2) Jour. Amer. Med. Ass'n., Nov. 21, 1914.

scant anterior and posterior sthenic removal, the alignment in the nose externally and internally will be satisfactory and adequate.

"3. If the bulging extremities of the nasal tubercles, ridge and vomer, when obstructing the nares, are not relieved, the result of the operation is unsatisfactory to the patient.

"4. The removal of posterior pressure is more important than a harmonious anterior picture and unequal space in front does not necessarily disturb respiratory and drainage functions.

"5. Fresh anastomoses will restore obliterated vessels to the extent of presenting a normal vascular septum if tramatism has not been unreasonable.

"6. Areas in which mucous membrane were lost and replaced by squamous epithelium will probably crust, with occasional intermittent hemorrhage and irritation of the nose.

"7. Perforations may be avoided if at least one firm side of mucous membrane is allowed to remain intact.

"8. In soft, collapsible roof and sides, a greater margin of cartilaginous and bony ring should be left to support the flexible nose and prevent drooping.

"9. Drainage and perforation posteriorly will not injure the nose and will prevent exudate and hematoma of the septum.

"10. The new fibrous replaced septum bears approximately the same relation to the perichondrium and periosteum as before.

"11. There is no evidence that the softer reorganized septum carries any functional disadvantage, even in its vasomotor relations."

[Such conclusions are well-founded and represent the consensus of opinion on the subject.—Ed.]

Perforation of the Nasal Septum. John C. Warbrick[3] believes the treatment of a septal perforation of a small or a large size is not very satisfactory so far as restoration of the eroded part is concerned either in the cartilaginous or bony part; restoration seldom if ever occurs from treatment of any kind given and especially when the perforation is due to syphilis.

(3) Buffalo Med. Jour., May, 1915.

In some cases when the opening in the cartilage is small and stationary, in a healthy person, there might be a chance to fill it in if from an ordinary cause. But even then, everything being favorable, it would require a good deal of time and patience and be difficult to do on account of mucous and crusts forming in the passages causing irritation along with other foreign material getting into the nostrils to cause ulceration.

To restore a larger perforation in any part of the septum is almost an impossibility, according to Warbrick. When the opening is small in the front part of the nose it is about the best time to try and close it if possible.

Silver nitrate may be used to heal the edges and help promote the growth of the tissue surrounding the opening. A flap operation of some kind may be done if conditions are favorable in the nostrils to close over the space.

A small piece of thin bone may be inserted if possible on one side between the cartilage and tissue and nitrate of silver used to heal the surface over by promoting the growth of the tissue. The same method may be tried with a small piece of ivory. In a small perforation that can not be closed, or in fact any kind of perforation, large or small, the object to be attained would seem to be to keep it from getting larger. This can be done by keeping the nasal passages as free as possible of mucous and crusts by spraying it out. The edges should be kept clean and any ulcerations healed over by the application of silver nitrate whenever necessary to prevent bleeding.

When there is a large perforation in the septum due to syphilis with necrosed tissue on the floor of the nose with a tendency to bleed, the following method is useful: Cleanse the nostrils by spraying them out and removing all the crusts and scabs, then apply phenol, 5 per cent. solution, to all the surfaces. Iodol, 5 per cent. solution, may be used in place of phenol or they may be used together. Silver nitrate may then be used 20 or 30 grains to the ounce and applied freely to all the surfaces.

Submucous Resection. Fisher[4] gives his conclusions concerning the submucous resection of the septum as follows:

(4) New York Med. Jour., May 22, 1915.

1. The submucous operation, having but very slight risks, is indicated in all cases in which the removal of displaced or hypertrophied septal bone and cartilage will restore the proper functions of the nasal chambers and their contents; such as cases in which there is actual mechanical blocking, or in which there is interference with ventilation and drainage of the sinuses, or in which pressure on the turbinates produces headaches and other reflex phenomena. It is indicated in cases of deafness and ear suppurations, in which nasopharyngeal trouble traceable to the septal deformity is contributing to such deafness or suppurations.

2. The submucous resection is not a panacea for all ailments of the nose and nasopharynx, and before doing one, it is well to bear in mind its limitations, especially so far as reducing the deformity is concerned, in spite of extensive removal of bone and cartilage, for instance, in a case in which the deflection occurs in such a high position that it is not safe to extend the resection so far. In such a case it must first be determined whether the removal of that which is possible, will give a satisfactory result.

3. The operation is absolutely contra-indicated in all cases that show presence of atrophy, and should not be done in children except as a matter of last resort.

4. In cases of marked hypertrophy, with or without a deviation, it is well to try a Wassermann reaction before operating.

5. To get a good result, care must be taken to remove every bit of the deviation, going to the very floor of the nares if necessary, but not so with the upper end of the triangular cartilage, where a sufficiently large strip must be left for support.

6. The submucous operation is an office operation, and can be performed readily and safely without particular preparation of the patient.

7. Most of the regrets in the operative cases come from not having removed enough bone, rather than from having removed too much; more particularly is this true of the bony ridges along the floor.

8. A good submucous resection might not produce the

desired results because of failure to reduce a hypertrophied inferior turbinate previous to the operation.

9. In acquiring the technique of the operation, it is well to learn to rely on the sense of touch as much as if not more than on the sense of sight.

10. Packing, if employed, should be loose and carefully applied, and when once removed need never be replaced.

11. Persistent bleeding after the removal of packing usually indicates infection, and the case should be so regarded and treated.

12. Serious injury to any vital parts during operation is extremely unlikely, unless extraordinary violence is employed, and whatever disappointments do arise are usually the result of excessive timidity on the part of the surgeon.

Some Points on the Submucous Resection of the Nasal Septum. J. B. Blue[5] considers this important operation too lightly.

[Blue's post-operative use of cocaine and adrenalin in daily treatment is to be deprecated as unsurgical. It is the experience of very reliable observers that such treatment protracts the convalescence unduly.—Ed.]

The After-Treatment of Submucous Resection of the Nasal Septum Without the Use of Splints. W. Milligan[6] prefers to use Whitehead's varnish in coaptating the septal flaps, contending that the patients suffer less discomfort, that the healing is more rapid and that hematomata never have developed.

Whitehead's varnish is:

Gum benzoin	℥ iv
Styrax	℥ iii
Socotrine aloes	gr. xl
Balsam of tolu	℥ i
Iodoform	℥ iv
Ether	℥ v

This varnish is painted over the perichondral surfaces and the membranes nicely coaptated. In case the nasopalatine artery bled freely when the maxillary crest was

(5) Memphis Med. Month., May, 1915.
(6) Jour. Laryngol., Rhinol. and Otol., February, 1915.

removed the bleeding can usually be controlled by needling it after the method of Krause, later using the varnish.

The Sinuses.

Histologic Pathology of the Accessory Sinuses. J. C. Beck[10] concludes that the pathologic change found in middle turbinates and the curetted portions of the ethmoid cells in asthma cases resembles quite strikingly the bone change found in osteomalacia, acromegaly, and otosclerosis.

In non-suppurative cases the absence of inflammatory elements, such as round-cell infiltration, inflammatory edema or myxomatous degeneration at the expense of glandular structures, is quite striking. The lining of the larger sinuses must be eradicated entirely before resolution will take place.

The similarity in pathologic conditions in non-suppurative sinuitis and atrophic rhinitis suggests to Beck the possibility of the etiologic agent being a disturbance in the glands of internal secretion.

Notes on a Case of Nasolachrymal Disease. A. Kahn[1] reports a case of a man of 66 who complained of periodic epiphora, and severe frontal headache. The history is incomplete, as the duration of the trouble is not noted. It is said that the patient had had a radical antrum operation three years previously.

The author's examination revealed a nasolachrymal duct obstruction with no evidence of pus in the sac, and a severe pansinuitis. All the symptoms were relieved after institution of well-directed surgical treatment.

It appears the patient had been treated for lues previously, because of a "locomotor-atactic gait and lightning pains."

Kahn reviews the literature without giving a bibliography.

[It would appear that the article is misnamed; it should be accessory sinus disease with nasolachrymal obstruction as complication, not as main condition.—Ed.]

(10) Ann. Otol., vol. 22, p. 914.
(1) Interstate Med. Jour., September, 1915.

Trifacial Neuralgia from Nasal and Accessory Sinus Disease. Attention is called by G. B. Jobson[2] to the great difference of opinion existing among medical men relative to the pathology and treatment of this most painful affection. For years, physicians have tried to find some means of giving permanent relief to these sufferers and treatment has varied according to the changing ideas of the cause and pathology of the disease. This author disagrees with those who believe that only a few of the cases are caused from periferal irritation, for in his experience the nose and accessory sinuses have frequently been the causal factor.

Areas of contact between turbinates and septum may be a cause. Neuralgia from antral disease is not so common as that from frontal sinus involvement, because there is rarely so much pressure in the antrum from retained secretions as in the frontal sinus. Infra-orbital, supra-orbital and dental neuralgia are not uncommon in antral disease. In chronic empyema the pain may resemble migraine, or may be limited to the surface of the antrum. Supra-orbital neuralgia is frequent in all forms of frontal sinuitis. Ethmoiditis is more liable to cause headache than neuralgia. The seat of the pain should not be depended upon for locating involvement.

Ultimate Results of Operations for Chronic Sinus Disease. In this article J. C. Beck[3] considers chronic suppurative sinuitis.

In the antrum, if the condition is due to infected teeth or alveolar necrosis, prompt recovery usually takes place if these causes are eliminated, without directing very much treatment toward the antrum.

If there be marked degenerative changes of the membrane more radical measures are necessary. At first the natural opening is enlarged, through which subsequent treatment is carried out, but 50 per cent. of cases require still more radical measures. After doing the Caldwell-Luc or Canfield operation or following the suggestion of Skillern and resecting the bony angle of the pyramidal aperture, another 40 per cent. end in recovery. In the other 10 per cent. a very radical exenteration is neces-

(2) Penn. Med. Jour., March, 1915.
(3) Jour. Otol. and Oto-Laryngol., 1915, vol. 10, p. 41.

sary and one must aim to fill the cavity with granulation tissue.

Concerning chronic ethmoid suppuration, the author states that while in a large number of cases the end-results are good, or at least satisfactory, in most cases there is always a little purulent discharge which is much increased with every acute rhinitis. In about 75 per cent. of frontal sinus cases the patients are cured by the endonasal method. The remaining 25 per cent. require some external more radical operation. Some of these patients may be cured without sacrificing the lining membrane. The majority, however, require the removal of the lining membrane with the Beck osteoplastic operation. Two of Beck's patients required the sacrifice of the anterior bony wall.

With the Killian operation suppuration was cured, but a deformity resulted.

Sphenoid cases respond readily.

In the chronic non-suppurative sinus disease almost every patient was cured of local symptoms of nasal obstruction and headache.

Asthmatic attacks have been reduced in frequency, but never entirely relieved. The relief from ocular symptoms was one of the most striking results noticed by Beck. The sense of smell and taste almost always return.

For chronic adhesive middle-ear disease the author has abandoned operative treatment because results did not warrant the continuation.

Beck reports good results from the so-called Heath operation in children. Phillips' suggestion of doing the complete mastoid operation without disturbing the middle-ear has produced equally good results.

Frontal Sinus Suppuration with Results of New Operative Procedure. A series of sixteen cases of frontal sinus suppuration in which he operated with good result is reported by H. A. Lothrop.[2] It is interesting to note that the patients had been previously operated on either by conservative intranasal or radical external procedures. In several there was a combined sinuitis.

The Technique of Operation: Roentgenologic examination should be made, both as an aid to diagnosis and par-

(2) Jour. Amer. Med. Ass'n., July 10, 1915.

ticularly to determine the anatomic characteristics of the sinus. A lateral and an antero-posterior view should be taken. The patient should be etherized and placed in a position half-way between sitting and lying. Just before etherization a pledget of cotton wet with adrenalin (1 to 2,000) and cocaine hydrochloride (4 per cent.) solution should be placed in each anterior ethmoid region. This will lessen the amount of hemorrhage and facilitate working in this region. These pledgets are removed when the patient is anesthetized and the nasal cavities are to be tamponed from the posterior nares or with small strips of gauze introduced anteriorly, preferably the former, thus avoiding the annoyance of blood reaching the pharynx. The ether is supplied through a catheter or curved mouth-piece.

[The Fille-Brown ether vapor method has been satisfactory in the hands of the Editor when employing external procedures on the frontal sinus.—Ed.]

The eyebrow should not be shaved. A single, curved, one-inch incision is made in the inner portion of the eyebrow, limited externally by the supra-orbital notch; saving the supra-orbital nerve in this manner avoids the unnecessary complication of numbness and then parasthesia along its distribution. The sensory disturbance caused by dividing the fibers of the supratrochlear nerve are trivial. The bone is then bared of the periosteum over an area extending to the bregma below, over the prominence of the frontal above and internally nearly to the mid-line, externally to the supra-orbital notch, the presence and extent of the sinus having been portrayed by the *x*-ray picture. The sinus is entered with a chisel and the opening enlarged with rongeurs, so as to make an oval opening about ¾ inch long. The region is then explored with a probe, and pus granulations, and polypi are gently removed, if present, after which this probe is to be passed through the ostium into the nose and left *in situ* as a guide. Small, curved curettes are then passed down from above just in front of the probe and the walls of the cells on the floor of the sinus are broken up. On account of the proximity of the anterior end of the cribriform plate to the ostium frontale, the posterior angle of the sinus should be constantly avoided.

The operation is to be completed by means of burr drills devised by Tilley and Ballenger for antrum operations and by rasps fashioned for this operation for O. A. Lothrop. The rasps should be used first and may be passed from above and below through the enlarged ostium, cutting forward and laterally. The burrs and rasps are to be used alternately at the discretion of the operator, gradually reaming out all the dense bone of the floor of the sinus toward the base of the nose.

As can be seen in specimens, this bone includes the nasal crest and spine of the frontal bone, the thick ends of the nasal bones and the nasal process of the superior maxillary bones. The interfrontal septum should be perforated and then burred away so that the other sinus may be explored. Then, by means of the burr, the perpendicular plate of the ethmoid should be removed by deeply notching it so that a probe may be passed in both cavities with ease. Through this same opening in the anterior sinus wall and also through both sides of the nose, both of which are now accessible, the dense bone under the opposite sinus is burred or rasped away until, finally, there remains only a thin shell of bone around the whole circumference of the floor of the sinus in front.

In all cases, even when only one sinus is affected, experience has shown the wisdom of using the combined floor of both sides.

Finally, one determines that a sufficient notch has been made in the perpendicular plate, and that cells opposite the lachrymal bone, the agger nasi cells and neighboring ethmoid cells have been broken down. If the antrum has served as a reservoir a sufficiently large opening under the inferior turbinate should be made.

The skin incision is then closed without a drain and the tampons from the nasopharynx are removed. It is usually not necessary to pack for hemorrhage; the patient afterwards is propped up in bed. There should be little edema of the upper lid. After-treatment is simple as the sinuses are so easily accessible.

Note on a Tumor of the Maxillary Antrum. H. N. Taylor[3] reports an interesting case. The patient complained of pain "in the right side of the face." The

(3) Lancet, May, 1915.

region of the right antrum revealed pain on pressure and fullness of walls, intranasal and extranasal. Transillumination was opaque. On operation, a hard lobulated tumor was removed. It was attached to bone in one place. The exact pathologic character of the tumor could not be ascertained as there was no normal tissue. The patient was relieved from the pain.

X-ray Examination of the Sinuses. In studying the radiogram of a skull in the antero-posterior position, C. H. Ballard[4] draws a line perpendicularly through the center of the frontal bone and symphysis of the lower jaw, thus bisecting the skull. He calls this the radiographic mid-line of the face. Through this line are drawn two horizontal lines, one at the junction of the frontal and nasal bones and one at the anterior nasal spine, thus dividing the skull into six areas. With this empirical arrangement one can better study the picture having landmarks for orientation.

The Pathology and Treatment of the Spheno-ethmoidal Sinus. The anatomy of the recessus sphenoethmoidalis is minutely described together with the pathologic changes of the mucus membrane in this region by P. J. Mink.[5] In the anatomic description the author lays particular stress on the close proximity of the sphenopalatine ganglion to the membrane covering this region of the nasal chamber. The distribution of the nerve fibers is traced out and he shows that some of the pathologic changes in the membrane are closely associated with the nerve changes. He suggests that such conditions as atrophic rhinitis and ozena might be ascribed to trophic disturbances in the ganglion.

The Nose, Throat and Accessory Sinuses in the Etiology of Chronic Infectious Arthritis. Roland Hammond[6] in an interesting paper on this subject gives the result of his study of sixty-one cases. The patients were not selected in any way, but as they appeared were referred for examination and treatment by the nose and throat surgeons when deemed necessary by them. The cases were nearly all polyarticular in distribution, and

(4) Western Med. Review, December, 1915.
(5) Archiv. f. Laryngol. u. Rhinol., vol. 29, No. 2.
(6) Jour. Amer. Med. Ass'n., Sept. 25, 1915.

were the bulk of that interesting and often puzzling group of joint cases, encountered in the daily routine of any adult orthopedic clinic. Cases were referred for examination, even in the absence of any symptoms pointing to disease of the ear, nose, throat or sinuses.

Otherwise, these patients were all treated in the routine manner. They were referred to other departments of the hospital, when necessary, for consultation and treatment and laboratory and Roentgen investigations were made in nearly every case. In classifying these cases as positive or negative, according as the patients showed disease of the nose, throat or sinuses, or did not, the opinion of the nose and throat surgeon was taken as the sole criterion, even in cases in which it seemed to the orthopedist that some other etiology was probable.

The result of this investigation is shown in Table 1:

TABLE 1.—PREPONDERANCE OF TONSILLAR INFECTION.

Total number of cases studied	61
Cases with doubtful nose and throat evidence	3
Cases with negative nose and throat evidence	28
Cases with positive nose and throat evidence	30
Cases with positive nose and throat evidence in which nose and throat operation was performed	12
Cases with positive nose and throat evidence in which such operation was not performed	18

In Table 1, the large proportion of cases showing tonsillar infection is noteworthy.

Of the twelve patients operated on, the tonsils were removed in nine, pockets in tonsils were opened in one, the frontal sinus was drained in one, and a deviated septum corrected in one. In two of the cases of tonsillectomy the adenoids were also removed, and in another case the middle turbinate was removed to drain the ethmoid cells.

Of the eighteen patients not operated on, the tonsils were infected in twelve, there was sinuitis in three, otitis media in one, necrosed teeth in one, and Riggs' disease in one.

The condition of the arthritis following operation for disease in the nose or throat in twelve cases is shown in Table 2:

TABLE 2.—CASES SHOWING POSITIVE NOSE OR THROAT DISEASE AFTER OPERATION.

Marked improvement	2
Slow but gradual improvement	3
No improvement (one with ankylosis)	2
Better in one joint, worse in two others	1
Worse in joints after operation	1
Not found	3
	12

The advice given in eighteen cases with positive nose and throat evidence in which operation was not performed is shown in Table 3:

TABLE 3.—CASES SHOWING POSITIVE NOSE AND THROAT AFFECTIONS NOT OPERATED ON.

Operation advised but either refused or not yet performed (4 improved without operation)	10
Operation not advised (2 improved without treatment)	4
Operation not advised but treatment advised (1 improved without treatment)	2
Referred to dentist	2
	18

Of the twenty-eight patients with negative nose and throat evidence, five had necrotic teeth, three had Riggs' disease, and two had had arthritis following removal of adenoids and tonsils, in one case six weeks, in the other nine months, after the operation. In the last two cases no connection between the operation and the arthritis is presupposed. In making this report the author feels that care should be taken in drawing conclusions from a small number of cases. The difficulties in the way of proper deductions are many. It is a well-known fact that deep in its crypts the most innocent appearing tonsil may harbor microörganisms of a harmful nature. The *Streptococcus hemolyticus,* which is the special agent found in associated joint lesions, lies in deep chronic abscesses and sealed crypts. Consequently, it is very difficult in a doubtful case to determine whether operation should be urged or decried. In the case of an infected sinus, the difficulty of proving its relationship to an existing arthritis is even greater.

TABLE 4.—POSITIVE NOSE AND THROAT EVIDENCE IN CASES WITH OPERATION.

Age.	*Joints.*	*Duration.*	*Nose or Throat Condition.*	*Operation.*	*Results.*
9	L. knee	2 weeks	Tonsils infected, adenoids present	Tonsillectomy	Improved
23	L. elbow, r. knee, r. wrist, l. ankle.....	5 months	Acute tonsillitis	Tonsillectomy	Slight, gradual improvement
26	Elbows, wrists, hands, r. knee	7-8 years	Tonsils infected, adenoids present	Tonsillectomy, adenectomy	No improvement (ankylosis)
27	Hands, wrists, r. knee, r. elbow	1¼ years	Tonsils infected.....	Tonsillectomy	R. wrist better, l. wrist and l. elbow worse
28	Shoulder, knees, wrists, ankles	6 months	Tonsils infected.....	Tonsillectomy	Throat better, joints worse
24	Shoulders, knees, feet.	6 months	Deviated septum.....	Septum corrected...	Not found
48	L. knee, l. elbow, r. wrist	5 years	Tonsils infected, teeth necrosed	Tonsillectomy (arthrotomy)	Improved, both throat and joints
12	L. hip, hands, r. knee..	3 months	Tonsils infected.....	Tonsillectomy	Very slight, gradual improvement
21	Knees, ankles, wrists..	2 months	Frontal Sinuitis... ...	Sinus drained	Not found
14	L. ankle, knees, hips..	7 years	Tonsils infected.....	Tonsillectomy	Joint condition no better, but less pain
44	Shoulders, knees, spine	4 months	Tonsils infected.....	Tonsillectomy, adenectomy	Slow, gradual improvement
42	Wrists, hips, ankles...	11 years	Pus on middle turbinate	Turbinate removed, pockets in tonsils opened	Not found

TABLE 5.—POSITIVE NOSE AND THROAT EVIDENCE IN CASES WITHOUT OPERATION.

Age.	*Joints.*	*Duration.*	*Nose or Throat Condition.*	*Operation Advised.*	*Results.*
35	Knees, ankles	3 weeks	Frontal Sinuitis.....	None	Not found
48	Shoulders, knees, hips, wrists	5 months	Left otitis media.....	None	Improved
12	Knees, r. ankle.....	6 months	R. tonsil infected.....	Tonsillectomy	Improved
8	Knees, feet	4 months	Tonsils infected, adenectomy	Tonsillectomy, adenectomy	Improved
54	R. wrist, r. elbow, r. knee	3 months	Tonsils infected.....	Tonsillectomy	Not found
34	Feet, l. knee.....	2 months	Tonsils infected.....	Tonsillectomy	Not found
21	Knees, hip, ankle, hand, spine	3 weeks	Tonsils infected.....	Tonsillectomy	Not found
42	Wrist, knee, shoulder, ankle	3 months	Mucopus in epipharynx, Riggs' disease..	Teeth extracted ...	No improvement (ankylosis)
45	Hands, feet, shoulder, knees	11 years	Suppurative ethmoiditis and polypi.....	Turbinectomy	Slight, gradual improvement
26	R. ankle, r. knee.....	1½ years	Necrosed teeth.....	Referred to dentist	Not found
18	Feet, hands	5 months	Tonsillitis, ethnoiditis.	None	Not found
48	Feet, r. thumb, r. knee.	4 months	Pockets in tonsils, sinuitis, Riggs' disease	None	Improved
56	Wrists, ankles, knees..	2 years	Tonsils infected.....	Tonsillectomy	Not found
38	Shoulders, knees, hands, spine, feet	3 months	Tonsils infected.....	Tonsillectomy	Not found
15	Knees, feet, wrists, elbows, shoulders	4 weeks	Tonsils infected, adenoids present	Tonsillectomy, adenectomy	Much improved
39	Hands, r. hip, r. ankle.	2½ years	Otitis media, sinuitis..	None	Died of periositis femur
24	Knees, shoulders	1½ years	Tonsils infected.....	Tonsillectomy	Not found
32	Knees, feet, shoulders, ankles	6 months	Tonsils infected, Riggs' disease	None	Slight, gradual improvement

It would have been profitable to have investigated other focal sources of infection in these joint cases, such as necrotic teeth, Riggs' disease, lesions of the genito-urinary and gastro-intestinal tracts, gall-bladder and other infections. Since the study was limited to the nose, throat and accessory sinuses, the conclusions must be based on a study of diseases of those organs.

According to Hammond, the results of operative treatment in these cases were, on the whole, not encouraging. The removal of tonsils or the draining of a suppurating sinus have produced marked improvements in the joint conditions in these cases in only a few instances. Often there has been slow, gradual improvement as is seen under routine orthopedic treatment. The general condition of the patient has improved after the nose and throat operation in nearly every case. It seemed as if a load had been removed and the general health was much better.

It is to be remembered that the majority of these cases are chronic in nature, and marked improvement is not reasonably to be expected except with the lapse of considerable time. This is even more true when ankylosis is present.

In most of these cases the damage seems to occur early in the course of the disease. The time for investigation and treatment of a focus is in the early stages or even before the onset of the arthritis. Patients who have had previous attacks and have recovered without permanent damage to the joints should have the focus removed, if it can be discovered, in order to prevent the recurrence of other attacks. This is especially true in the numerous cases in which attacks of tonsillitis have been followed by arthritis. When permanent damage to the joint structures has occurred, but little improvement may be expected from removal of any focus of infection, beyond the improvement in the general health.

Prenasal Operation for Frontal Sinus Suppuration by the Anterior Route. P. Watson-Williams[7] describes his variation of the intranasal approach to the frontal sinus. He prefers to avoid removing the middle turbinate and takes off the "ante-conchae" cells with a punch forceps, then uses a series of sounds which gauge the

(7) Lancet, Feb. 20, 1915.

caliber of the nasofrontal duct, making it sufficiently large to insure drainage.

The author gives credit for the intranasal approach to the frontal sinus to E. Fletcher Ingals.

The Intranasal Operation for Suppurative Sinusitis. M. Halle[8] cautiously uses "suppurative diseases" in his title and then describes in detail his operation for opening the frontal and sphenoidal sinuses to allow sufficient drainage permanently. He reviews the various intranasal methods and shows the advantages of his method. The article is well illustrated, even showing instruments which he suggests should be used in the proper performance of the method.

A series of case reports with the end-results are given.

Inflammatory Conditions in the Accessory Sinuses. W. Uffenorde[9] states that the macroscopic picture of the inflammatory conditions within the accessory sinuses can be differentiated frequently, although it has been taught for a long time that there were no sharp lines of differentiation. This is because the real picture is greatly changed by reason of a local anesthetic having been used. In the catarrhal edematous form within the antrum one sees a very pale, brawny edematous, thick mucous membrane, and frequently there is beginning true polypoid degeneration. Here, also, originate many of the retronasal polypi and the beginning involvement of the middle turbinate. In the cavity one frequently finds a stringy, clear, mucous secretion. It is not infrequent to find this condition in conjunction with foreign bodies, tumors or tuberculous processes.

The picture in the chronic suppurative form is quite characteristic; the membrane is bloodier, of a changed consistence, uniformly swollen in the earlier cases, and less in the more chronic. A fibrous change takes place mostly in the connective tissue layer. The periosteum becomes thickened and one finds that it can not be removed so easily as in the edematous form, the bone presenting not such a smooth appearance. Free pus, usually foul smelling, is encountered.

---

(8) Archiv. f. Laryngol. u. Rhinol., vol. 29, No. 1.
(9) Zeitschr. f. Ohrenh., vol. 72, No. 3.

The mixed or combined forms present a combination picture.

Several exceptionally good illustrations in three colors accompany this article showing the microscopic picture in the various conditions.

In another article, the same author[1] states that having been impressed by the apparent failures in treating inflammatory conditions within the accessory sinuses, determined to ascertain the reason if possible. There is no other condition which gives such a variety of symptoms both general and local, no other class of patients who visit many various physicians in search of relief from their annoying complaints.

When dealing with the antrum of Highmore in a purely suppurative condition, one may expect a fairly good result from creating and maintaining a sufficiently large opening into the cavity to allow drainage and treatment. The Clamé operation has given good results in his cases. In the combined types of inflammation such as the *Serös-Catarrhalischer* one must operate. In a case with polypoid degeneration and suppuration one must do an operation such as the Caldwell-Luc.

In the care of frontal sinus cases often one can effect a cure without destroying the mucus membrane but it is safer and results are more certain when the mucous membrane has been removed.

In polypoid cases, in which earlier in his experience he used a cold snare for removal and was accustomed to see an early recurrence with exacerbation of previous symptoms and some complications such as bronchitis, Uffenorde now prefers to trace the origin and remove radically the mucous membrane at its site. His results are much more satisfactory. Conservatism in dealing with or destroying the turbinates is of great importance to the patient's post-operative comfort.

Treatment of Frontal Sinusitis. E. Winkler[2] in an extensive article describes the various kinds of frontal sinus disease and treatment indicated in each. He emphasizes the difficulty in choosing the proper operative attack in any one particular instance as there is such a

(1) Zeitschr. f. Ohrenh., vol. 72, No. 4.
(2) Archiv. f. Laryngol. u. Rhinol., vol. 29, No. 1.

variation in the extent of disease and amenability to treatment.

He contends that it will be necessary to retain the external operation for certain cases despite the good results reported for intranasal procedures. The external operation offers the best chance of eradication of any condition and cure. He is not a strong supporter of the Halle method, and contends that too few cases have been reported to show that the intranasal methods, especially the Halle method, are better than the external procedures.

Treatment of Ethmoiditis. S. McCullagh[3] in dealing with the treatment of ethmoiditis divides the conditions into two classes:

I. Acute Ethmoiditis: (1) catarrhal; (2) suppurative.

1. In this particular instance no direct treatment need be instituted. Proper drainage and ventilation within the nasal chambers will care for the condition.

2. Drainage is absolutely essential and surgical measures should be instituted to see that drainage is established and maintained. It frequently is enough to straighten the septum. If orbital complications seem eminent, the author uses the second portion of the Killian operation in exenterating the ethmoid.

II. Chronic Ethmoiditis: (1) subacute; (2) chronic hyperplastic; (3) chronic atrophic; (4) chronic purulent; (5) syphilitic; (6) tuberculous.

1. One may expect a good result from vaccines providing all hindrances to natural drainage have been removed.

2. In the lesser degrees of this condition correction of nasal deformities interfering with drainage is again the essential factor. The author forbids the home use of watery solutions for cleansing purposes as he feels that this treatment aggravates the condition by continually irritating the sensitive structures. The use of silver nitrate sometimes appreciably reduces the hyperplasia in the milder forms. In the advanced cases, radical intranasal surgical measures must be used.

3. In this condition, radical exenteration offers the

(3) New York Med. Jour., July 24, 1915.

only hope, followed by treatment of the mucous membranes post-operatively.

4. Radical exenteration, first intranasal, and if this does not clear up the condition one of the extranasal measures must be used.

5. Well-directed antisyphilitic treatment.

6. Rare condition—no direct treatment.

The post-operative treatment consists in taking care of conditions as they arise, letting Nature take its course.

Operation of Choice in Maxillary Sinus Disease. G. P. Marquis[4] tends to favor the Denker operation for maxillary sinus disease because it allows one to see all regions of the cavity better than other operations except the Canfield. These operations are very similar and really differ only in that in the Denker the incision is within the oral cavity, and in the Canfield the incision is within the nose. The Denker operation allows for greater retraction of the soft parts, but causes a loss of sensation in the lateral incisors and usually bicuspid. The postoperative dressings are done through the nose in both instances.

[A better title for this paper would be "Operation of Choice in Cases of Maxillary Sinus Disease in which the Simpler Intranasal Operations Fail to Give Satisfactory Relief."—Ed.]

Empyema of the Nasal Accessory Sinuses. H. C. B. Lewis[5] expresses the following views:

1. Diseases of the nasal accessory sinuses are more prevalent than is generally supposed.

2. The subjective symptoms are never clear, and are frequently misleading.

3. The objective symptoms are almost always pathognomonic.

4. The present methods of diagnosis leave little to be desired.

5. These diseases are frequently responsible for impairments of the general health.

6. Complications, unless induced by faulty surgical technique, seldom prove fatal.

7. Appropriate treatment rarely fails to effect a cure.

---

(4) Ann. Otol., March, 1915.
(5) St. Paul Med. Jour., 1915, vol. 17.

The principle of treatment is to establish permanent drainage, insure ventilation of the cavities, and remove all diseased parts with a minimum sacrifice of tissue and the avoidance of deforming external operations.

Conservative measures comprise the following procedures: (1) local applications of cocaine and adrenalin; (2) suction; (3) infraction of the middle turbinate or removal of the anterior end; (4) removal of septal deformities when necessary; (5) curettage of the anterior ethmoidal cells and the nasofrontal duct.

Conservative Treatment of Inflammation of the Accessory Sinuses of the Nose. The local treatment for acute sinus disease recommended by J. L. Maybaum[6] is a 4% per cent. solution of cocaine in adrenalin, 1 to 1,000, thoroughly applied to the anterior end of the middle turbinate and the middle meatus, followed by irrigation of the nasal cavity with warm saline solution. This measure, repeated twice daily, contributes considerably to the relief of the patient's urgent symptoms. The hot saline irrigation not only washes away the excess cocaine solution but, in addition, serves the excellent purpose of relieving the intense congestion of the nasal and sinus mucosa. Inhalation of menthol, 10 per cent. solution in hot water, may be used. Passive hyperemia by means of an appropriate suction apparatus applied to the nostrils is a useful measure in the declining stage of the disease.

Maybaum concludes his paper as follows:

1. Acute and chronic sinuitis is so frequent an accompanying condition of acute coryza, influenza, and other infectious diseases that a recognition of the early signs and symptoms should be at the command of the general practitioner.

2. Recourse to palliative therapeutic measures, when taken during the early stages of acute sinuitis, usually results in early restitution to normal.

3. In recent years radical operative measures in the treatment of the severer types of sinuitis have been replaced by conservative surgical procedures.

4. Absolute indications for radical operative treatment are definite, *i. e.*, orbital or cerebral complications

(6) Med. Record, June 19, 1915.

or frequent severe acute exacerbations of chronic sinuitis after persistent conservative treatment.

Roentgenology of the Accessory Nasal Sinuses. The roentgenogram has become an invaluable aid in the diagnosis and treatment of accessory nasal sinus disease. That its use is not more universal is to be regretted, for the anatomic and pathologic information derived therefrom can not be gainsaid.

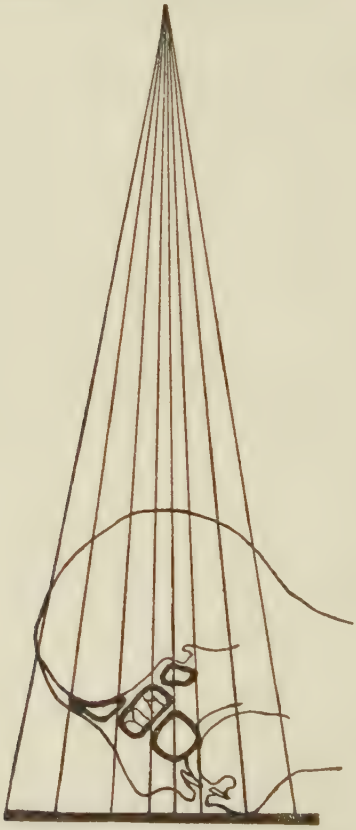


Fig. 19. Diagram showing the modification of the postero-anterior position and the projection of the rays upon the plate.

Carl W. Waldron[7] says that with an unvarying technique a fairly exact interpretation of the plate may be made. More than 1,000 Roentgen examinations of the sinuses have been made at the Johns Hopkins Hospital during the fifteen months prior to writing this article. The postero-anterior position has been used as modified by Dr. C. A. Waters of the Department of Actinography. (Fig. 19.) Waldron describes Waters' technique as follows:

"An important factor in making roentgenograms of the nasal sinuses is being exact in each individual case, and intimately associating oneself with the style of head with which one is dealing. . . . Waters has classified two distinct types—namely, the concave and the convex face; and there is a difference of an angle of only two degrees in the entire technique. . . . Only three points are essential in order to obtain roentgenograms of this region as described: First, the chin should always touch the plate; second, the long axis of the tube should be parallel to the plate; third, the nose of the patient should be from 1 cm. to 1.5 cm. from the plate. Under this rule, the importance of knowing which style of head one is dealing with is obvious. For instance, in the convex-shaped face, the nose is 1 cm. from the plate, whereas in the concave-shaped face the distance should be increased by about 0.5 cm." (Fig. 19).

By this technique, the shadows of the petrous portions of the temporal bones are projected beneath the floors of the maxillary sinuses. This is a decided advantage in double maxillary sinuitis, especially in children (Plate XI). The shadows of the posterior ethmoidal cells are shown below those of the anterior group. This was demonstrated by the application of silver clips and the injection of bismuth paste.

Results in Ninety Consecutive Operations on Maxillary Sinus. Harvard McNaught[8] reports the results of ninety consecutive intranasal operations on the antrum of Highmore for chronic suppuration. At present, in nine cases there continues to secrete a gradually lessening

(7) Interstate Med. Jour., October, 1915.
(8) Jour. Amer. Med. Ass'n., Sept. 4, 1915.

amount of pus. Only in four cases was re-operation ultimately necessary by the radical method. In these four cases cystic and polypoid degenerations of the mucous membrane were found which precluded a cure from drainage and aëration alone.

The method used in McNaught's series is practically that of Krause, though modified lately by the advent of Reeves' punch. The modification simply does away with the use of snare and scissors as the turbinate is bitten out by the punch. After anesthetizing the lateral wall with powdered cocaine and epinephrine, a probe puncture is made and the antrum filled with 1 per cent. novocaine solution with a few drops of epinephrine added. After fifteen minutes a painless and bloodless operation can be done. With a Wilminski perforator, the antrum is broken into in the middle meatus about one-half inch behind the anterior end of the inferior turbinate. Pressing down firmly, the wall and turbinate are crushed through to the floor. Reeves' punch is then used to remove the fragments and enlarge the opening. No packing is used at any time. In the subsequent treatment a nasal douche is not used, as McNaught has found that it not only favors granulation formation, but actually prolongs the discharge of pus. With a curved cotton-wound probe, the opening is painted weekly, or oftener, with strong silver nitrate solution until healed, and no difficulty has ever been found in keeping it patent. Improvement takes place very quickly in some cases, when apparently at a standstill, if the interior of the antrum is painted with increasing strengths of silver nitrate solution, using as high as a 40 per cent.

Relation of Localized Headaches and Some Organic Eye Lesions to Intranasal Accessory Sinus Diseases. P. J. Livingstone[9] states that some physicians disclaim that the close relation of the sinuses to the orbital cavity is the constant or almost constant cause for grave disease of the optic nerve, associated with disease of the accessory sinuses; but rather that final intra-ocular lesion, especially optic atrophy and retrobulbar neuritis, appears in these cases as a general vascular intoxication. Livingstone believes, however, that the consensus of

(9) Jour. Amer. Med. Ass'n., Sept. 25, 1915.

opinion of those of largest experience is that these two serious conditions, associated with sinuitis and ethmoiditis are dependent on pressure of exudate, either by direct exudate pressure or distended sinus walls, or local extension of infection or new growth. The important group of ocular symptoms due to accessory sinus disease is made up of those cases of optic neuritis, neuro-retinitis and thrombosis without external signs of orbital inflammation. The second class of cases comprises those persons coming frequently for relief of frontal and orbital headache, by the way of refraction correction. One will not find pus in the anterior portion of the hiatus semilunaris to indicate antrum disease, or in the posterior portion to indicate posterior ethmoid disease, but one will find on inspection often a very narrow middle meatus, sometimes on account of a large, turgescent, intensely red middle turbinate, which of itself fills up the middle meatus, obstructing drainage. Sometimes a high septal deflection is to be found impinging on the middle turbinate, causing pressure swelling. Often these patients have much irritation of the so-called sensitive area with sneezing, frequent head-colds and conjunctivitis of greater or less degree. Livingstone is convinced that many of the latter class deserve more careful examination for obstruction of the middle or superior meatus for the relief of trying frontal and orbital pains.

Tuberculosis of the Frontal Sinus. In reporting two cases of this disease Jerome B. Thomas[1] stated that tuberculosis of the frontal sinus, judging from the published reports, is an extremely rare disease, only five cases having been reported at the present date. Tuberculosis of other nasal accessory sinuses is relatively more common, but is likewise rare, though in recent years observations increase rapidly to the effect that a large proportion of cases of chronic sinuitis occur in the tuberculous though the sinus discharge may not contain the tubercle bacillus.

Thomas claims that there are several factors that tend to protect the frontal sinus from tuberculous infection, including such common factors as the cilia, mucus, tears and the bactericidal action of the mucous membrane, supplemented by the high position and natural drainage

(1) Jour. Amer. Med. Ass'n., July 24, 1915.

of the frontal sinuses. However, a study of the statistics of sinus disease observed in bodies dead of tuberculosis strongly suggests the probability that tuberculous sinuitis does occur much more frequently than it is recognized.

The diagnosis depends on careful bacteriologic examination of the sinus secretion in suspected cases, securing as large a quantity of secretion as possible and using sedimentation. The so-called antiformin method is a good one, he states. Animal inoculation should be resorted to if the simpler methods fail, care being taken to remove the secretion directly from the sinus if possible, to avoid accidental tubercle bacilli present in the nose.

Tuberculin may serve as a valuable diagnosis aid.

In more advanced forms of tuberculous frontal sinuitis, the middle turbinate and adjacent ethmoid cells are apt to be involved and sections of mucous membrane or fungoid growth may demonstrate typical tubercles or giant-cells. Fungoid and cheesy degeneration of the lining of the sinus, even in the absence of demonstrable tubercle bacilli, has a high diagnostic value.

The symptoms do not differ from those of simple chronic sinuitis until advanced bone involvement or general tuberculosis add their factors to the symptom-complex.

A history of previous bone disease in a tuberculous subject suffering from chronic sinuitis should lead one to suspect the bony walls of the sinus. A negative Wassermann reaction lends great weight to the differential diagnosis.

Osteoma of Frontal Sinus. V. A. Chapman[2] reports an interesting case of osteoma of the frontal sinus.

A woman, aged 52, consulted Chapman May 14, 1908. She stated that she had been having headaches for three years, "since having the grip." Some enlargement of the right supra-orbital ridge region was apparently bearing down on the right eye. She had headache almost constantly, and sometimes it was very severe. A large, irregular, nodulated, ivory bone tumor was removed from the right frontal sinus. The tumor rested in the frontal sinus, and by pressure erosion had caused a small perforation of the anterior bony wall. There was con-

(2) Michigan State Med. Soc. Jour., September, 1915.

Normal sinuses in child of eight. The ethmoidal cells are well developed; the frontal poorly. There is slight clouding of the left maxillary sinus.—Waldron.

Chronic suppuration of both maxillary sinuses in child of ten. There was marked nasal discharge without headaches or other general symptoms.—Waldron (see page 300).

PLATE XI.

PLATE XII.

Entamoeba buccalis.—Brunelle and Ginsberg (see page 310).

siderable milky white, thickened mucus about it, and it was this which caused the fluctuation on palpation. The tumor extended from near the external angular process of the frontal bone to nearly an inch past the median line, thus extending over into the left frontal sinus. A large projection of the tumor had pushed down into the ethmoid region beneath the nasal bones. The tumor had arisen by a short pedicle springing apparently from the diploë of the skull above the frontal sinus. There was a thin layer of bone compressed in a fissure between the left projection of the tumor and its main body. This was the portion that extended over into the left frontal sinus.

DISEASES OF THE THROAT.

THE MOUTH.

A Study in Blood Counts in Relation to Vaccine Therapy: Auto-inoculation in Treatment of Mouth Infections: In a lengthy article J. Head[1] describes or recounts the results he has obtained by various methods of treatment in mouth infection and suggests that as matter of prophylaxis the teeth be cleansed in a methodical manner and that the child be taught early.

The interspaces are first to be cleaned with dental floss followed by use of tooth brush. The brush should be 1½ inches long with bristles not over ¼ inch long. If the bristles are too stiff, soaking in warm water for a moment will soften them sufficiently. In the mechanical cleansing three motions of the brush are necessary: first, a rotary motion whereby all the gums and teeth anterior to the second molars are cleansed with a vigorous whirling action; second, the drawing motion, wherein the middle of the brush is placed behind the wisdom tooth and is drawn vigorously across the gum margins of the teeth; third, the brush is placed on the gum and tooth line behind the third molar and drawn sharply forward over the inside of the central incisors, care being taken to follow the curve of the arch with the face of the brush.

(1) Med. Record, July 31, 1915.

Teeth as Foci of Infection. F. B. Kremer[2] after discussing the facts regarding the teeth as foci of infection draws the following conclusions regarding their surgical treatment.

Teeth may also become foci of infection by direct mechanical irritation of nerve-trunks or terminals by inducing atrophic or nutritional neuroses, thereby lowering their own resistance, as well as that of the immediately adjacent structures.

In examination of the mouth to determine its etiologic value in disease it is not alone sufficient to look for decay and its sequelae, but one must also keep in mind the possible presence of unerupted teeth as well.

By reason of the transitory character of the teeth, they are not suited for, and should not be subjected to, surgery below the alveolar border, except it be for their complete removal.

Due to the complex processes which the maxillary bones are called on to perform, they are peculiarly prone to become the seat of pathologic change.

The teeth are inherently organs of such low vitality that pulp devitalization as a surgical or therapeutic measure is distinctly contra-indicated.

Decay of children's teeth may be of serious consequence, and should be carefully thought of in relation to the physical and mental welfare of the child; and, lastly, unerupted or impacted teeth may be, and often are, foci of infection of the gravest character.

Mouth Hygiene. E. L. Fisk[3] advocates the following rules for the care of the mouth and teeth:

1. Beginning in infancy, a thorough physical examination and survey should be made at regular intervals, in order to detect any possible focus of infection or any physical impairment that may lead to the formation of such a focus.

2. The practice of personal hygiene all along the line should be instituted in order that the general resistance to infection may be raised to the highest power.

3. Proper diet should be provided in infancy, which means, wherever possible, mothers' milk, in order that

(2) Journal-Lancet, March 15, 1915.
(3) Lancet-Clinic, Sept. 11, 1915.

there may be a regular and healthy development of teeth and jaws. As the child grows older, normal habits should be cultivated, especially vigorous use of the jaws by thorough mastication and the eating of hard, resistant, crusty foods every day.

4. Fruit should be included in the diet between meals, especially apples, which mechanically clean the teeth, and which by the action of fruit acids remove the mucin plaques that favor decay.

5. There should be thorough mechanical cleansing of the teeth with clean water and stiff brush, used with a rotary motion, not forgetting the tongue.

6. There should be thorough dental cleansing of the teeth at least every six months.

7. If, unfortunately, dental decay has taken place, care must be observed on the part of the dentist thoroughly to treat infected roots, so that a septic focus may not be sealed in by a filling. In all cases of doubt, the *x*-ray should be used in order to determine the condition of the roots. It is said that few people arrive at maturity without a chronic alveolar abscess. An *x*-ray of the jaws as a starter in the mouth hygiene would be a wise precaution for every one.

8. The development of the teeth should be closely watched, and irregularities interfering with proper contact between upper and lower teeth should be corrected or prevented. The earlier this is done the better for the patient.

9. Bearing in mind that the endamebas are possible factors in pyorrhea, a simple, harmless preventive is available in a mouth wash made by adding two drops of fluid extract of ipecac to a half glass of water, used before retiring. This will not be of any service in well-established cases of pyorrhea, but in the earliest stages it may check the condition.

10. When pyorrhea has become fully established, no pains or expense should be spared in curing the condition, as it is a constant menace to life and health. Experience has shown that this disease can be cured by thorough and persistent treatment, if there has not been too much destruction of the tooth sockets. When the teeth are hopelessly loosened and the sockets destroyed,

it is often far better to remove them, just as it is far better to extract an abscessed tooth rather than to endanger the patient's condition by endeavoring to save it. It is better to lose a tooth than to lose a heart or a kidney. On the other hand, the tooth should not be ruthlessly extracted on the first suspicion of trouble. Common sense and a due sense of proportion are necessary in these matters.

The Blind Dental Abscess. H. L. Ulrich[4] has contributed to a considerable extent to the subject of focal infections. In a careful study of a fairly large series of cases the practicability of a careful examination of the teeth as a possible seat of infection, he summarizes the clinical manifestations in the following table:

NUMBER OF TIMES CLINICAL MANIFESTATIONS OR SYMPTOMS WERE NOTED IN SEVENTY-SIX CASES OF STREPTOCOSIS WITH ALVEOLAR ABSCESSES.

Rheumatoid conditions	39	Gastric-ulcer	4
Cardiac lesions	36	Cystitis	3
Secondary anemia	33	Pharyngitis	3
Chronic amygdalitis	30	Ascites	2
Pyorrhea	20	Glucosuria	2
Albuminuria	19	Prostatitis	2
Caries	12	Conjunctivitis	2
Visceroptosis	10	Primary anemia	1
Adenopathy	8	Enteritis	1
Neuritis	7	Syphilis	1
Bronchitis	6	Iritis	1
Hypertension	6	Emphysema	1
Nephritis	6	Exophthalmic goiter	1
Tuberculosis	6	Rhinitis	1
Leukocytosis	4		

Cancrum Oris Treated with Neosalvarsan. A. G. De Sanctis[5] describes a case of cancrum oris in which he used 0.45 neosalvarsan intravenously following a curettement of the lesion and use of phenol (carbolic acid) at the base of the lesion. A mouth-wash was also used. The following day there was a marked improvement in the local and general condition and the author attributes this to the neosalvarsan. There had been no treatment instituted previous to his examination.

(4) Jour. Amer. Med. Ass'n., Nov. 6, 1915.
(5) New York Med. Jour., Sept. 25, 1915.

[The Editor does not believe that this is sufficient grounds for basing such an opinion, in so far as other ordinary treatment was carried out.]

Pyorrhea Due to Organisms Other than the Ameba. A case of pyorrhea that resisted all local and general treatment is reported by G. H. Hoxie.[6] Amebae were never found. There were recurrent attacks of fever over a period of seventeen years. There were other foci of infection aside from the mouth, *e. g.,* anal folds and a bursitis of the left knee. The organisms most constantly found were a diplo-streptococcus and a mold.

The author suggests that in this case the causative organism is one which is ordinarily non-pathogenic, but which has acquired parasitic power in this patient.

Recent Investigations Regarding the Etiology of Pyorrhea Alveolaris. Commenting on the discovery by Smith and Garrett of *Entamoeba buccalis* as the cause of pyorrhea alveolaris, A. Peterson[7] suggests that it might be the same organism described by Prowazek in 1904, by Steinberg in 1862, by Grassi in 1879, and by Flexner in 1892. Not all cases can be said to be caused by ameba.

Chiovare of Rome believes that the ameba has a phagocytic action in place of being a causative agent.

T. B. Hartzell and A. T. Henrich[8] find that streptococci of the viridans group are constantly present in peridental suppurative lesions. These streptococci are normally of low virulence, but are at times able to produce lesions of the heart, aorta, kidneys and joints, some of which closely resemble the lesions of rheumatism. These organisms are potentially of high virulence. It is not proved that they bear an etiologic relation to dental abscesses and pyorrhea, but from the point of view of metastatic infection it is important to know that such organisms are constantly present in lesions presenting a large ulcerated surface through which they may and probably do frequently pass into the deeper tissues and the blood-stream.

---

(6) Jour. Amer. Med. Ass'n., Nov. 27, 1915.
(7) Svenska Läkaresälsk., Förh., April 6, 1915.
(8) Jour. Amer. Med. Ass'n., March 27, 1915.

Constitution Disturbances with Endamebic Pyorrhea. J. S. Evans and W. S. Middleton[9] report a study of seventy cases of endamebic pyorrhea and call attention to the frequency with which constitutional disturbances complicate endamebic pyorrhea. Arthritis, particularly of the type arthritis deformans, is the most frequent complicating disorder and the local and general administration of emetine hydrochloride not only benefits the pyorrhea but markedly improves the arthritis in a large percentage of cases. In addition, unexpected relations between pyorrhea and certain remote conditions are established through the response to the emetine treatment.

Entamoeba Buccalis and Alveolo-Dental Pyorrhea. The most recently described organism, held accountable for the condition, is *Entamoeba buccalis*. Up to the present time the organism has not been cultured, and in consequence the satisfaction of Koch's postulates has not been possible. This, in turn, has created skepticism in the minds of many as to the etiologic specificity of the parasite. Brunelle and Ginsberg[1] quote Bass and Johns as asserting that *Entamoeba buccalis* is primary in its attacks, that the countless other organisms which are present, are secondary invaders, and that this endameba is not present in normal mouths. Others take the opposite view, regarding the entameba as a possible secondary infective agent and sometimes present in normal mouths. In debatable questions of this nature the addition of further data is always of value.

In 356 cases examined by Brunelle and Ginsberg the following technique has been used. Both lingual and labial sides of the teeth were inspected, and the gums of an apparently infected tooth were massaged or a broad sterile toothpick was gently pressed against the side of the tooth. The material so obtained was placed on a glass slide, air dried, fixed in methyl alcohol, and stained in Giemsa's stain after the method of Williams. In mouths in which no apparent lesion existed, the toothpick was inserted beneath the gum.

Brunelle and Ginsberg examined the mouths of fifty children between the ages of 3 and 6 years, with but one

(9) Jour. Amer. Med. Ass'n., Jan. 30, 1915.
(1) New York Med. Jour., Sept. 11, 1915.

(2 per cent.) positive finding. This child had a mouth generally unclean, with carious teeth and spongy and bleeding gums. The variance in results may be explained by the fact that the children were exceptionally well cared for and inspected regularly by a dentist. In the positive case the child was examined shortly after admission.

With the adult mouth their investigations follow very closely the reported results of Bass and Johns. Thus, of 123 mouths showing no apparent lesions, three (2.5 per cent.) gave positive results, while 107 cases of frank pyorrhea, 102 (95 per cent.) gave positive findings. In thirty-seven mouths showing a pyorrheal tendency *Entamoeba buccalis* was found in twenty-nine (79 per cent.) upon first smear, while in a series of thirty-nine cases referred to them by dentists, who went directly into a pus pocket with a dental scraper for material to be examined they had 100 per cent. positive results (Plate XII).

In summary, Brunelle and Ginsberg show that *Entamoeba buccalis* is almost constantly present in pyorrheal conditions, and is rarely present in healthy mouths.

Treatment of Pyorrhea Alveolaris with Iodine. E. S. Talbot[2] does not think that the endameba has been demonstrated as a cause of pyorrhea. He regards the disease as due to irritation, but believes that there is no evidence that it is a local disease. A constitutional irritation may also cause the absorption of the alveolar process which is the initiatory step in the production of loose teeth and produces a cavity which is later invaded by germs among which may be the endameba. Talbot uses a preparation of iodin which he calls iodo-glycerine and which consists of zinc iodide, 15; water, 10; iodine, 25; and glycerine, 50. This he applies with cotton wound around wooden applicators, painting the gum margins above and below. The lips and cheeks are held away from the jaws until the iodine has dried. These applications should be made every day and continued until the patient is dismissed.

Pyorrhea Alveolaris Treated with Mercury. B. L.

(2) New Orleans Med. and Surg. Jour., March, 1915.

Wright and R. G. White[3] have treated twenty-eight consecutive cases, in all of which have the patients been completely cured in remarkably short periods of time. Of these, nine patients or 32.1 per cent., had systemic infections in all probability secondary to pyorrhea, six of these being chronic arthritis, one chronic gastritis, one chronic bilateral facial neuralgia, and one chronic laryngitis. In addition, two others had gonorrheal arthritis. All of these systemic infections, including the cases of gonorrheal arthritis, were also cured. The longest period of time required to effect a cure was forty-one days, the shortest four days. The greatest number of injections required to cure the primary infection in one case was six, smallest number one.

The local treatment as administered by White embraces the following: Careful expression of the pus from the pockets, thorough removal of calcareous deposits and tartar wherever found, the extraction of hopeless teeth and roots, polishing of tooth structure, followed by applying to the margin of the gums equal parts of tincture of iodine, tincture of aconite and chloroform continued every other day. The injections of mercuric succinimide should be commenced with the local treatment. The initial injection in a male patient should be 5/5 grain repeated every seventh day, or depending on the condition of the patient, the dose of each succeeding injection may be slightly reduced. In females the dose should be from 1/5 to 2/5 grain less.

Emetine Treatment of Pyorrhea Alveolaris. Adair[4] does not believe that the ameba is the causative factor in this disease. Ameba are too frequently found in healthy mouths to be said to be the principal causative factor. He treats certain cases with emetine, however.

Oral Osteitis in its Relation to Arthritis. In this article, B. C. Darling[5] shows some very instructive *x*-ray pictures of blind dental abscesses. He arrives at the following conclusions:

1. As a first rather than a last resort special attention must be paid to the condition of the teeth.

---

(3) Med. Record, March 13, 1915.
(4) Atlanta Jour.-Rec. of Med., April, 1915.
(5) Med. Record, March 13, 1915.

2. Good health demands the constant close attention of a conscientious and scientific dentist.

3. Much old and unscientific dentistry, such as bad crown and bridge work and root fillings that are not scientific, must be removed, and the conditions remaining properly treated; failing this, merciless extraction and false teeth, but a clean mouth.

4. Pyorrhea alveolaris is a menace to good health; it is a chronic ulcer of the gum and finally of the bone, and assuredly a focus of infection.

5. There should be coöperation with mutual recognition of responsibility between physician and dentist.

6. The search for the hidden focus of infection, while being very extensive and careful in the oral cavity, should not be confined to it, but should extend over every possible seat of infection.

7. Even though the hidden focus be found and the cause of the systemic infection removed, the seed of the disease has been thrown broadcast and many expedients will be required before a recovery is effected.

THE TONGUE.

Parenchymatous Glossitis Following Submucous Resection of the Septum. F. C. Raynor[6] reports a rare complication following the septum operation. He suggests that he has never seen a report of such a case; however, this complication has been encountered.

Six days following the septum operation the patient complained of being unable to swallow and of a sore throat. Examination showed the tongue filling the mouth with no other complication discernible. A blood culture taken at this time gave a pure culture of staphylococci, whereas a lesion near the frenum showed streptococci. Four days later the patient developed facial erysipelas.

Acute Glossitis. B. E. Summers[7] reports a case of acute glossitis:

H. F., colored, female, aged 23, married, the mother of three children—all healthy. Family history, negative.

Past History: Of no importance.

(6) Laryngoscope, April, 1915, p. 227.
(7) Old. Dominion Jour. Med. and Surg., August, 1915.

On April 23, 1915, she was taken with sore throat; tonsils were swollen, and she had more or less salivation. On the morning of April 24, her tongue commenced to swell, and by noon it had filled the entire mouth and was protruding an inch or more. This swelling continued until the teeth cut great gashes in the tongue, causing some hemorrhage. The woman was unable to swallow liquids and she had to be fed with a medicine dropper. She had some dyspnea, which was relieved by the sitting posture, with her head hanging down. Cultures from the nose and throat showed the presence of large yeast organisms.

This patient was treated with saline purgation; ice was kept in her mouth, and strychnine and atropine were given hypodermically. In two days the tongue was greatly reduced in size, and the woman was able to take liquids from a glass.

Abscess of the Tongue. This case is reported by J. V. White.[8]

The patient, a man, was 28 years old. He contracted tonsillitis, which followed the usual course. On the fourth day he began to feel pain in swallowing, radiating down the trachea and over the side of the neck, accompanied with chills and fever. These symptoms continued, each day developing greater intensity and causing a nervous irritability characteristic of exhaustion. This condition continued for ten days, without abatement. At this time he was suffering continually from pain. The tongue was swollen and coated with a white mucous secretion. He could not protrude his tongue without causing intense pain. The tip of the tongue was apparently normal, but the posterior two-thirds was very hard and hypertrophied, and occupied the whole buccal cavity. There was thickening of a few submaxillary glands. Palpation revealed an intense induration on compression. There was no fluctuation noticeable. The case continued the same for three days when on further palpation fluctuation was discovered. When fluctuation is well-established, the important point is to determine where to make the incision to liberate the pus. White recommends that an incision be made below the tongue

(8) Jour. Amer. Med. Ass'n., Sept. 25, 1915.

and a little to one side of the median line. This affords proper drainage, is not likely to become re-infected, and at the same time obviates the possibility of a tracheotomy. The bacteria present in this case were the staphylococcus and colon bacillus.

Leukoplakia Buccalis Lingualis. This is a valuable contribution to the literature, as the author, R. Levy,[9] has brought the bibliography down to date. Expositions of the various viewpoints are made which show that the present status of this interesting condition is still unsettled. A very interesting case from the author's practice is reported in detail.

Among the conclusions at which Levy arrives are the following:

"Leukoplakia is of special interest because of its doubtful etiology and because of the dispute regarding its degeneration into epithelioma."

"Leukoplakia is a generic term. Excluding syphilitic lesions it may be considered a pathologic entity."

"Our understanding of leukoplakia has been confused by attempts to describe a pre-cancerous stage or to establish the theory of its degeneration into a malignant growth. Leukoplakia may, however, be looked upon as a warning."

"Certain clinical manifestations may arise, which, though not positive, are sufficient to suggest the diagnosis of malignancy."

A Suction Tongue Depressor. This instrument has been designed by N. E. Titus,[10] of New York. In the course of adeno-tonsillectomies at St. Luke's Hospital, New York City, on the service of Dr. D. Bryson Delavan, Dr. A. P. Voislawsky, the associate attending surgeon, has been accustomed to use suction to remove the mucus and blood from the patient's mouth. For this a regular sucker was used; the tube of which was fastened to the sheet over the patient by a towel clamp. An ordinary tongue depressor was also kept on the patient's chest most of the time. So it occurred to Dr. Titus to combine these two instruments.

The instrument illustrated in Figure 20 combines suc-

(9) Laryngoscope, August, 1915, p. 539.
(10) Med. Record, Nov. 27, 1915.

tion with a tongue depressor and has been found most advantageous in keeping the operative field free of blood and mucus. The holes are on the upper surface of the tube, so that no suction is applied to the tissue of the

Fig. 20. Suction tongue depressor.

tongue itself. The uvula is sometimes caught, but no bad results have come from the effect of suction on this loose piece of tissue.

In view of the small caliber of the tube Titus has adopted the technique of having the operator immerse the suction tongue depressor in a basin of water as soon as the operation is completed. This point has been found sufficient to keep the tube free of clots which otherwise would easily form and make the instrument less effective. It is manufactured by the George Tiemann Company, New York.

THE PHARYNX.

A Hiding Place for Fish Bones in the Throat. J. D. Grant[1] calls attention to the space between the epiglottis and the base of the tongue. It was noticed after the laryngeal mirror was used in both hands, *i. e.*, alternately.

A Case of Severe Pharyngitis in Association with Erysipelas. H. S. Muckleston[2] describes the appearance of a sore throat in a particular case and calls atten-

(1) Clin. Jour., December, 1914.
(2) Canadian Med. Jour., November, 1915.

tion to the fact that this particular type has been called erysipelas by various authors. His patient developed erysipelas of the auricle and canal, but still Muckleston hesitates to say that the patient had erysipelas of the throat.

Many such cases have for the infecting organism the pneumococcus, whereas the streptococcus is usually thought to be the infecting organism.

He further points out from a study of the literature that the mortality is lower in those cases in which the disease has first manifested itself in the throat, than in cases in which the first manifestation was outside and later symptoms developed in the throat.

Pharyngeal Stenosis. The case of a seven-weeks-old infant who had had difficulty in breathing since birth is reported by H. Hallarman.[3] Examination showed a mass in the pharynx which did not account for the severity of the symptoms. A diagnosis of enlarged thymus was made and a thymectomy performed with relief for a week, then there was gradual recurrence of the symptoms.

Five months later, a diagnosis of pharyngeal obstruction was made by a consultant. Two months later the child died. Lobar pneumonia was the terminal affection.

Retropharyngeal Abscess. A. Logan Turner[4] reports a case of chronic glandular retropharyngeal abscess in an adult: L. W., female, married, aged 50, complained of an uncomfortable feeling in the throat when swallowing. The symptom was first noticed three months before her admission, and her attention had first been drawn to her condition by the existence of a swelling behind the upper part of the left sterno-mastoid muscle. The swelling was incised by the medical man whom she consulted at that time, and pus was evacuated. The abscess healed readily, and the scar had shown no evidence of breaking down. No further glandular enlargement could be detected on either side of the neck.

The nasal cavities and nasopharynx presented a normal appearance. Examination with the tongue depressor revealed a large smooth swelling occupying the left half of

(3) New York Med. Jour., Dec. 25, 1915.
(4) Edinburgh Med. Jour., October, 1915.

the oropharynx, passing for a short distance upward behind the soft palate and extending downward as far as the level of the epiglottis. The left posterior pillar of the fauces and tonsil and the lower edge of the soft palate were pushed slightly forward by the swelling. Its surface was covered by the mucous membrane, upon which coursed a few slightly dilated veins. It was firm but somewhat elastic to the touch.

A free incision was made in the lower half of the abscess, and a quantity of thick pus was evacuated. No caseous material was detected in it. Cultures showed a mixed growth of staphylococci and pneumococci.

Dermoid of the Pharynx. Poynton and Higgins[5] report a case of dermoid of the pharynx. A female infant, aged 5 months, was brought to the hospital by her mother because for five weeks the mother had noticed that the child had some difficulty in swallowing milk and occasional attacks of coughing and dyspnea. She had been curious enough to look into the child's mouth, and declared that she had seen a lump at the back of the throat which appeared at irregular times, and was then swallowed by the baby. The child appeared to be in perfect health, and on looking into the throat everything seemed natural, but on pushing the tongue-depressor well back and making the child "gag" a rounded, pinkish-white tumor suddenly appeared between the tongue and soft palate. It was evidently polypoid and moved with such rapidity that at one time it seemed to drop from the roof of the pharynx; at another to fly up from the depths of the throat. The swallowing efforts described by the mother were entirely accurate. Under anesthesia the tumor was at first invisible, and was then found to be hidden by the soft palate, lying behind it in the nasopharynx. It was seized with the forceps and drawn forward, and was found to be attached to the left lateral pharyngeal wall between the anterior and the posterior pillars of the tonsils by a narrow pedicle. A stout catgut ligature was tied round the base and the stalk snipped off with scissors. There was no bleeding, and the base of attachment appeared to contain no blood-vessels of any size. Recovery was speedy and uneventful.

(5) Lancet, March 27, 1915.

The specimen measured 1½ inches in length, and was ½ an inch thick at its broadest part, and a quarter of an inch at its narrowest. The color was a pale pinkish-white, and to the feel it was soft and smooth; it was covered sparsely with short, soft hair. On section with a knife it was rather tough, and at its center there was a small cavity in which lying loosely was a small glistening, pearly-white plate of cartilage. Microscopy showed an external covering of thin skin with normal layers of compound epithelium. Under this was the subcutaneous stratum showing hair follicles and sebaceous glands. Deeper still were fibrous and fatty tissue and, in the center, cartilage.

THE TONSILS.

Observations on the Tonsils. Deviating from the title of his paper A. McKenney[1] attacks the enthusiastic tonsil operator with the same old and not at all convincing arguments.

Some Phases of the Tonsil Question. F. D. Sanger[2] believes that the tonsil operation, in a case in which the removal is indicated, is really a life-saving proposition. Until the function of the tonsil is really known and because it has proved the source of local and general disease, why should one hesitate to remove it?

Physiologic Function of the Tonsil. After reviewing the experimental studies of other men along the same line, C. Auersbach[2] records a number of personally conducted experiments in which he tries to confirm the findings—*e. g.*, that the tonsils are a part of the lymphatic system which drain the membrane of the nose. He used various coloring substances and dyes, applying them locally and also injecting both into the nasal membranes and tonsils. At various intervals the tonsils were examined macroscopically and microscopically, to ascertain if any and how much coloring material was to be found. He came to the conclusion that up to the present time, any connection between the mucous membrane of the nose and tonsil stricture had not been established.

(1) Kentucky Med. Jour., June 1, 1915.
(2) Southern Med. Jour., August, 1915.
(2) Archiv. f. Laryngol., vol. 29, No. 1.

The Importance of the Faucial Tonsil as a Portal of Entrance in Tuberculous Cervical Adenitis. The conclusions arrived at by B. C. Willis[3] after his study of a series of twenty-nine cases are as follows:

1. Of this series 86 per cent. showed involvement of the faucial tonsils.
2. Tonsils appearing normal may have microscopic tubercles.
3. The tonsils and adenoids should be suspected as a portal in all cases of tuberculous cervical adenitis, except in those cases which have demonstrable lesions about the head and neck.
4. Early removal of a tuberculous tonsil frequently induces absorption of glandular involvement, and prevents or reduces the frequency of further systemic infection.
5. Tonsillectomy is the operation of necessity.
6. Necrotic glands should be drained.
7. The best after-treatment should be carried out.

Some Generally Unrecognized Points in the Anatomy of the Tonsils. The blood supply of the faucial tonsil is not uniform, in fact the blood of each tonsil in the same individual varies greatly, says J. D. Heitger.[4]

In the majority of instances, however, one may say that the blood-supply is derived from the following source:

From the facial artery, the ascending palatine artery course upward between the stylopharyngeus and styloglossus muscles, and in the region of the tonsil breaks up into several branches which unite with the branches of the descending palatine of the internal maxillary artery to form an anastomosing ring at the base of the tonsil. From this ring, a tonsillar artery and small capillaries pierce the so-called capsule of the tonsils to enter the real tonsillar tissue.

Various authors believe this tonsillar artery to be of great import in tonsillectomy, while others believe that it may be disregarded.

Davis has shown that the tonsillar branch of the facial does not reach the tonsil at all, although it is generally

(3) Southern Med. Jour., December, 1915.
(4) Lancet-Clinic, Feb. 9, 1916.

thought to be the most important source of arterial blood-supply. He shows, further, that the tonsillar artery from the anastomosing ring formed by the ascending and descending palatine arteries enters the tonsillar fossa at its upper extremity, and may enter the so-called capsule directly or pass downward between it and the muscular aponeurosis for a distance of half an inch before entering the tonsil. A vein accompanies the artery. Another vein emerges from the tonsil at the same place, but courses downward. These, Davis says, may be held responsible for the usual bleeding.

Embryologic variation may cause a superior lobe to be hidden in the supra-tonsillar fossae and thus elude the operator. Careful pre-operative examination will do much to avoid embarrassment after operation.

Tonsils and Chronic Cervical Adenitis. The vexed question of the relation of the tonsils to the source of infection in cases of chronic cervical adenitis has been, and is being, much debated. This indecision seems largely, if not entirely, due to a lack of direct evidence of the infectivity of the tonsils in these cases.

The following investigation was carried out by H. Gardiner[5] with the idea of determining what, if any, evidence there was bacteriologically of the infectivity of the tonsils in cases of chronic cervical adenitis in which there was no apparent and obvious source of infection. The investigation was limited to these cases in order that the issue should be as clear as possible. For this reason not only were cases of obvious infection in the regions draining into the cervical glands excluded, but also all cases in which the glands became enlarged from below upward and in which tuberculosis of the lungs was also present were neglected. The method adopted was as follows:

1. In cases in which the tonsils were enucleated they were transferred at once to a sterilized capsule or tin case. The capsule on the deep surface of the tonsil was then incised with all aseptic precautions, and a small portion of the deepest part of the tonsil was removed and inserted into the subcutaneous tissue of a guinea-pig. A

(5) The Lancet, Oct. 2, 1915.

culture was also taken from the tonsil in this region and subsequently examined.

2. In cases (only a few) in which the tonsil had not been completely enucleated, and in which, therefore, the tonsil (never less than two-thirds of the whole gland) was liable to infection from without, this surface was lightly cauterized and the tonsil then dealt with as above.

On analyzing Gardiner's table of thirty cases the following facts are clear: Organisms of some sort were found in 24 (80 per cent.) of the cases. Of these organisms there were present the following:

M. catarrhalis	in 7	cases—	*i. e.*,	25.0	per cent.
Staphylococcus	" 5	"	"	16.6	"
Pneumococcus	" 7	"	"	25.0	"
Streptococcus	" 7	"	"	25.0	"
Bacillus coli communis	" 2	"	"	7.0	"
Tubercle bacillus	" 4	"	"	14.3	"
Friedlander's bacillus	" 1	"	"	3.5	"

In some cases several organisms were found together and in six cases nothing was found; but it is possible that in four of these cases tubercle bacilli were present, as the guinea-pigs in these died too soon (some from purely accidental causes) for the post-mortem examination to have any absolute negative value.

Gardiner draws the following conclusions:

1. In the majority of cases (80 per cent.) of chronic cervical adenitis in which no obvious source of infection is present the tonsils are infected.

2. The size of the tonsil makes no difference to the infectivity, except that the small fibrotic variety is likely to be more dangerous than the large.

3. The number of cases in which tubercle bacilli are present is relatively small, but is larger than in simple cases of enlarged tonsils.

4. The frequent presence of other organisms than the tubercle bacillus in these cases suggests that a large proportion of the so-called chronic tuberculous glands are in reality chronic septic glands.

5. The organisms are present in the deepest parts of the gland, and are therefore only removed by operations involving complete enucleation.

The Tonsils in Relation to Systemic Diseases. Parker[5] in an article on this topic reaches these conclusions.

The size of the tonsil is of negative importance.

A small submerged tonsil with crypts covered over may be most dangerous.

In recurrent tonsillitis, regardless of their size, the tonsils should be removed.

Tonsils should be removed from tuberculous children, even though they appear normal. The author would also remove the tonsils from children living in a home with open tuberculosis.

A remnant of a tonsil left after incomplete removal when covered by a scar becomes a most dangerous focus of infection.

Cheesy, foul-smelling crypts should be eradicated, or good drainage established by splitting the crypts.

Perfectly normal-looking tonsils with no history of tonsillitis are frequently found to exude pus on pressure.

Ragged, spongy tonsils are nearly always infective.

In all systemic infections in which diligent and competent search fails to remove other source of focal infection, the tonsils should be removed.

Individuals known to be sensitized to streptococci should have the tonsils removed as a prophylactic measure.

A culture taken from the interior of the tonsil after removal may be made use of for making vaccine for possible future use, which, in some case, may be of inestimable value.

Focal infection in the tonsils should be treated by complete enucleation. There is no physiologic reason why a part of the tonsil should remain.

It is not sufficient to find one focus of infection in a given case, but most important to find all foci of infection. It is therefore necessary in many cases to coöperate with the dental surgeon, the aurist, the rhinologist, and the genito-urinary or other regional specialist. However, to the internist, pediatrist, or the family physician should fall the responsibility of coördinating these facts, dictating the necessary operations and future treatment.

(5) Journal-Lancet, April 1, 1915.

Some Infections of the Tonsils. F. C. Pybus[6] in discussing the treatment of tonsillar infections says that when the symptoms are mainly or entirely mechanical and fail to subside in three months after removal of any source of infection, partial removal may suffice, but the basal portion of the tonsil may enlarge and again cause symptoms. Many hypertrophied tonsils, so far as can be ascertained on inspection, do not appear to be grossly infected, but in tonsils thus deeply infected the basal portion, often the most diseased, is left behind, and may commence to give trouble, especially if some of the lacunae become partially or entirely sealed up in the process of healing.

When infective symptoms predominate in the tonsil itself, such as acute tonsillitis, or chronic lacunar infection, or when the tonsils are in addition enlarged, any source of infection must be removed, especially carious teeth. Nasal breathing must be re-established, and the case watched to see the effect of the treatment. When the tonsil is too severely affected to be capable of recovery, as judged by the recurrence of symptoms and the failure of the above measures, then total removal is indicated. Enucleation of the tonsil must necessarily prevent tonsillitis, and while it does not entirely prevent pharyngitis, such attacks are, as a rule, materially lessened in frequency. When repeated quinsies have occurred, further attacks may be prevented by removing the source of the infection—namely, the tonsil. For lymphatic gland infections, when tuberculosis is suspected, tonsillectomy is indicated, and the course of the glandular enlargement determines whether more extended operative measures may be needed. In pyogenic infections of the glands the tonsils must be dealt with when the acute lymphadenitis has subsided or been operated on, if suppuration has supervened. Chronic glandular enlargement of the mild or moderate degree, is so frequently encountered in hypertrophied tonsils, that when the tonsil recovers its normal character the glands subside also. No tonsil should be removed when acutely inflamed. For more distant infections, when the tonsil

(6) Brit. Med. Jour., May 22, 1915.

is suspected of being the focus, removal is indicated when the general condition is satisfactory.

In all these cases total removal is the operation of choice; it presents no greater danger than incomplete removal, and can be readily accomplished by the guillotine alone. While these methods directed to the individual are of great importance, there is no doubt that prevention of tonsil infection should be the chief aim. This is to be obtained by the advance of hygiene—personal, in the home, and in the school. The maintenance of nasal respiration, the prevention of dental caries, and the proper supply of food, in sufficient quality and quantity, will greatly diminish the prevalence of this condition. The provision of a cleaner air supply and the prevention of milk infection are measures needing attention. When that delicate balance between health and infection is upset, and the tonsil, a useful organ, becomes diseased and incapable of recovery, a timely removal of this focus may prevent more grave illness and disability. The question of infection of the tonsil and from the tonsil is not to be summed up in some form of operative procedure, but by attention to the numerous measures that have been indicated.

Entamebas in the Tonsil. A. J. Smith, W. S. Middleton and M. T. Barrett[7] report the finding of entamebas in the tonsil of persons who have pyorrhea alveolaris and suggest the possibility that in this way they may provoke systemic disease. The organisms were found in five out of seventeen cases of tonsils removed for chronic tonsillitis. The connection of this finding with systemic disease has not yet been proved but it is of great interest as a possible source of rheumatism, endocarditis and anemia.

Lingual Tonsillitis. According to J. G. Parsons,[8] primary inflammation of the lingual tonsil is very rare. However, sharing as it does the same lymphoid structure as the faucial and pharyngeal tonsil, it is often involved in inflammatory conditions affecting the other parts of the lymphoid ring. It is rarely the site of neoplasms. The lingual tonsil tends to increase in size with age, while

(7) Jour. Amer. Med. Ass'n., Nov. 14, 1914.
(8) Jour. of Ophthal. and Oto-Laryngol., August, 1915.

the other structures in the ring normally atrophy. The different infections which attack the upper respiratory passage during childhood and early adult life tend to lymphoid hypertrophy. Autotoxemia has quite an important bearing. In common with the rest of the lymphoid ring, the lingual tonsil suffers from the effects of obstructed nasal breathing. Small foreign bodies not infrequently set up an acute irritation which persists after the body has been removed. The symptoms are quite variable. Cough is fairly constant. In the more acute conditions there may be pain deep in the throat, associated with more or less difficulty in swallowing. Occasionally there is a marked edema, or even abscess formation, causing dyspnea. The engorgement of the lymph circulation from any cause may give rise to congestion about the Eustachian tube and earache.

Chronic Tonsillitis. A form with recurring gastric attacks, simulating dietetic derangement is described by Louis Fischer.[9] Enucleation was done and the case terminated in recovery.

"Chronic hypertrophic tonsillitis with frequent exacerbations of fever, headache, vomiting, and anorexia, may be mistaken for gastric or gastro-enteric derangement." The odor of acetone on the breath and presence of acetone in the urine during these explosions is suggestive of the tonsillar toxemia. These cases are often called cylic vomiting.

The author reports several such cases which cleared up after tonsillectomy.

[Evidence is accumulating which tends to show that chronic infection and acute inflammation in the tonsils as a focus are not infrequent causes for various systemic conditions such as gastric ulcer, appendicitis, rheumatism, goiter, etc.—Ed.]

Tonsillectomy. J. Matthews[1] says: "Complete removal of the tonsil in its capsule with the least possible danger and discomfort to the patient is the cardinal requirement of any operation on the tonsils."

He uses a blunt dissection after first cutting the pillars cleanly free and prefers also to dissect the plica below

(9) New York Med. Jour., Jan. 22, 1916.
(1) Jour. Amer. Med. Ass'n., Feb. 19, 1916, p. 503.

and remove it. He claims that failure to remove all the tonsillar tissue, even such an amount as might be confined in the plica, will often defeat the purpose of the operation.

Patients complain of discomfort and dryness following tonsillectomy because of an injury to the tonsillar branches of the glossopharyngeal nerve.

[The premise that injury to the tonsillar branches of the glossopharyngeal nerve causes dryness and pain, is not established.—Ed.]

Tonsillectomy: The Forward Inclined Sitting Posture Under Nitrous-Oxide-Oxygen Anesthesia and Other New Features. Denman and McKesson[3] favor a dissection operation in the upright position under nitrous-oxide-oxygen anesthesia.

The technique consists in having the patient in the sitting inclined position with the chin near the chest. A special chair with straps is necessary. The tonsil is dissected with a knife and finger and the snare is applied in the reverse position to that generally used. The tenaculum and snare remain *in situ* until the second tonsil is dissected, then both tonsils are removed at the same time. The authors claim that by this method there is less bleeding.

Conservative Treatment of the Tonsils. G. Hudson-Makuen[4] is well known for his ultra-conservative attitude toward the tonsil. He sounds a warning to the men who operate on the tonsil for the most vague reasons imaginable.

"Local or topical applications to the tonsils, in my experience, have very little value except in instances where such treatment is indicated—" Removal of tonsils renders attacks of tonsillitis and pharyngitis less severe but it does not insure against such attacks. It is the author's firm conviction that the tonsil rarely is the focus of severe general infection.

Hudson-Makuen suggests the opening up of the crypts as a conservative method of attacking the tonsil. In case it is essential that the tonsil be removed he advises a careful capsule-splitting operation.

He deprecates the wholesale manner in which patients

(3) Amer. Jour. Surg., May, 1915.
(4) New York Med. Jour., March 11, 1916.

are "tonsillectomotized" in clinics as unsurgical in every sense.

Radical Treatment of Peritonsillar Abscess by Tonsillectomy During the Acute Stage of the Disease. H. A. Barnes[5] advocates tonsillectomy for the cure of quinsy during the acute attack. Furthermore, he dissects the opposite tonsil at the same time. General anesthesia is used. When the abscess cavity is reached care is taken to remove the pus with a suction apparatus or gauze sponge. There is no more bleeding than usual and the convalescence is not unduly protracted. Apparently the danger of a general infection has been over-estimated.

[The suggestion of this author is rather a radical departure from the general consensus of opinion among throat surgeons. It no doubt will require a long series of successful results for such a measure to be adopted. At present we can not look with favor upon such a suggestion.—Ed.]

Proper Position of Tonsillectomy in Pediatrics. S. Blum[6] claims that "tonsillectomy has become more than a therapeutic procedure: it has become a menace." There are too many patients operated on without positive indication. He says that this operation should not be performed in infants, and only very rarely up till eight years of age.

Blum contends that the tonsils are excretory organs, for he has recovered chemicals and bacteria, which had previously been injected into neighboring lymph glands, from the tonsils and oral secretions of guinea-pigs.

[Blum's experimental findings do not agree with those of Auerbach, who approached the subject with much less prejudice and concluded that the relationship of cervical glands, and oral and nasal mucous membrane, had not been established. No one believes that tonsils should be removed without an indication, and the use of the word "rarely" by Blum is well directed for there are children, infants too, who require a tonsillectomy which if postponed until the eighth year might result disastrously for the patient.

The Editor feels that Blum is too positive in his state-

(5) Trans-Amer. Laryngol. Ass'n., 1915, p. 368.
(6) Archiv. Pediat., November, 1915.

ments, not having proved his premises to begin with. —Ed.]

Tonsillectomy During Acute Endocarditis. After reviewing some of the literature on the sequelae of acute tonsillitis, W. G. Harrison[7] reports six cases in which tonsillectomy was performed during an attack of acute endocarditis. He arrives at the following conclusions:

1. Rheumatism or acute rheumatic fever, with its frequent complications of endocarditis, pericarditis, chorea, etc., is often the result of acute cryptal tonsillitis.

2. The milder attacks of tonsillitis with lower temperature and transient sore throat are more apt to be followed by arthritis than are the severe attacks of tonsillitis.

3. It is often wiser to perform tonsillectomy during an acute attack of endocarditis and remove the source of infection than delay with the hope of operating after the acute attack has subsided.

4. The tonsil crypts can sometimes be cleansed by local applications and by syringing with antiseptic solutions, but in spite of the most assiduous care it will sometimes be impossible to find every focus.

5. Cultures should be made from the tonsil in all cases of joint or heart involvement and properly preserved. From these cultures vaccines can be made and the patient properly treated with them in cases in which the fever and other signs of infection do not disappear within a reasonable time after operation.

New Tonsil Instrument. The forceps and additional

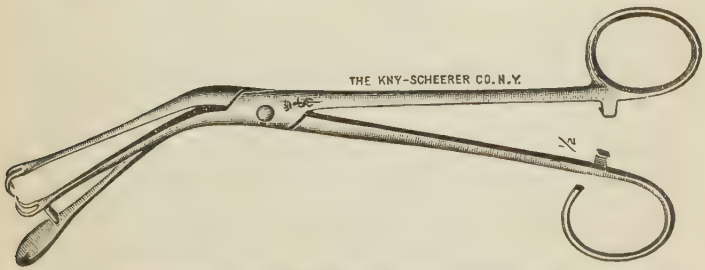


Fig. 21. Combined tonsil-seizing forceps and tongue depressor.

(7) Southern Med. Jour., January, 1915.

tongue spatula described by F. W. Alter[8] obviates the necessity of having an assistant hold down the tongue and the tongue is depressed at the point where the work is to be carried on (Fig. 21).

New Instrument and Technique for Circumcision of the Tonsil. This operation consists in establishing free

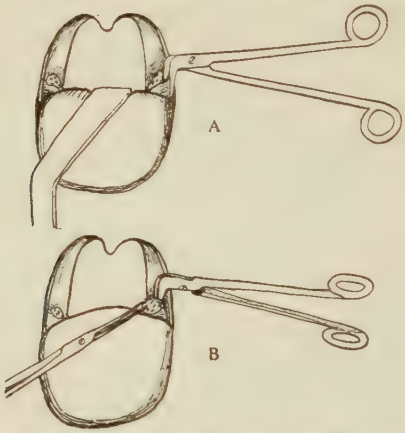


Fig. 22. New instrument and technic for circumcision of the tonsil: *A*, incision; *B*, grasping of tonsil with forceps.

drainage of the tonsillar and peritonsillar regions, with subsequent atrophy of the tonsil, by severing the attachments around the tonsil instead of enucleation.

The instrument used by F. G. Murphy[9] is a specially constructed scissors (Fig. 22).

The pillars are freed as deeply as possible so that at completion of the operation, the tonsil is attached only to the pericapsular tissue. The tonsil is not removed.

Tonsil Operations with Especial Reference to Singers. J. W. Voorhees[1] says that the risks in removing tonsils in singers are, of course, much greater than in other persons; hence it is well to study the patient half a dozen times, and see what can be accomplished by local applications. Pressure against the anterior pillar will in many cases force out a plug of foul, stinking secretion.

(8) Jour. Amer. Med. Ass'n., June 5, 1915.
(9) Jour. Amer. Med. Ass'n., Oct. 30, 1915.
(1) Amer. Med., March, 1915.

Such a tonsil can not be regarded as normal. If this condition persists, treatment including operation, if necessary, must be carried out. Voorhees believes that a great deal can be accomplished by local treatment; not merely by swabbing the surface of a tonsil which does little or no good, but by reaming out each crypt separately. A bulbous-end burr-screw is excellent for this purpose, since it can be attached to the dental engine and used in a way similar to the dentist's method of boring out a tooth cavity. Bleeding will be slight, but, of course, only the greatest delicacy should be used, and no pressure should be brought to bear. It is not the intention to burrow a hole in the neck, but merely to clean out the diseased pocket, which varies in depth, but is scarcely ever more than one inch. Local anesthesia should be induced by swabbing on and around the tonsil strong cocaine-adrenalin solution. After all pockets are thus cleaned out, one may irrigate each of them with peroxide solution in a syringe to which a small cannula, like the frontal sinus cannula, is attached. Following this, a long thin applicator is wound with the smallest bit of cotton that will take up an appreciable quantity of fluid. This is dipped in an aqueous solution of silver nitrate, from 40 to 80 per cent., and introduced to the bottom of each crypt.

With such a method no case of simple acute tonsillitis should last more than forty-eight hours.

Voorhees draws the following conclusions:

1. Make a careful diagnosis. Search especially for latent infections of the nose, accessory sinuses and nasopharynx.
2. Study out what is best for the individual patient. There is a choice of three methods: local applications of drugs, conservative operation (tonsillotomy) or radical operation (tonsillectomy).
3. Induce complete anesthesia and good hemostasis. Local anesthesia is best for adults; general anesthesia (ether) for children.
4. Follow the line of cleavage if removing a tonsil completely.
5. Do not over-treat the patient after operation.

Abscess Following Tonsillectomy Under Local Anesthesia. D. A. Vanderhoof[2] reports an unusual post-operative complication following tonsillectomy.

There was no unusual incident during operation. Five days later, the patient complained of pain under the jaw and on the seventh day could hardly open his mouth. The tonsillar fossae were negative but there was a marked swelling of the glands beneath the angle of the jaw. This swelling increased markedly in size until on the sixteenth day the eye was nearly closed. Aspiration of the mass revealed pus and it was treated surgically with good result. It was discovered that there was an opening from outside into the throat but this healed over.

Occurrence of Abscess of the Lung After Tonsillectomy; With a Report of Nine Cases in Adults. In this series of cases all occurred in a hospital practice. M. Manges[3] suggests that tonsil operating will never be satisfactory until a sufficient number of beds can be had for public patients. A careful pre-operative examination must be made, a cough and slight elevation in temperature are important and must be taken into consideration. "Three days in the hospital should be the shortest stay demanded of them." In his series the lung complication occurred mostly when the operation had been done under general anesthesia.

The causal factor may be, "(1) the anesthesia; (2) aspiration of infected blood or of pieces of tonsil tissue; (3) embolism or infarction of the lung; (4) some special infective agent; (5) some antecedent cause, either local or general." Of these Manges thinks that the second is the most important.

The onset of symptoms suggesting lung involvement appeared on the first day in two cases; on the second, third and fifth days in one case each; on the seventh day in two cases; on the tenth and fourteenth days in one case each. This same variation was noted by Bassim in his report of nineteen cases occurring in children.

In conclusion Manges asserts that the tonsil operation should in no sense be considered a minor operation. The possibility of such complications as here reported should

(2) Laryngoscope, January, 1915.
(3) Amer. Jour. Surg., March, 1916.

remind hospital surgeons that the care of these patients before, during, and after the operation should be commensurate with the possible dangers.

Lung Suppuration After Tonsillectomy. In a series of twenty-eight cases reported by H. Wessler[4], eight followed tonsillectomy under general anesthesia. The onset of symptoms is sudden with the picture of bronchopneumonia, and later suppuration supervenes with symptoms of sepsis and expectoration of purulent material. The time at which this condition developed was from eight days to two weeks after operation. Hemoptysis is a constant symptom and is of all degrees. Pain is not so frequent. A predilection for the right lung is frequently noted. The physical signs are misleading. The *x*-ray is a very valuable adjunct to the diagnosis. The mortality is not given. Spontaneous cure occurs after a protracted convalescence.

Meningitic Suppurative Extradural Abscess of the Posterior Fossa of the Skull After Purulent Tonsillitis. O. Peck,[5] of Vienna, reports an intensely interesting case in a girl, 7 years old, who became suddenly ill, with high temperature, headache, dizziness, and severe vomiting. Examination revealed a spontaneous nystagmus to the right, and complete facial and abducens paralysis on the left, with diminished hearing on the left side. The condition did not change for several days. The child was then taken to the clinic with a provisional diagnosis of tumor. She had no difficulty in walking. Examination at this time revealed the same findings as above, with the addition of total deafness on the left side, and the labyrinth not responding to tests. Middle-ear catarrh was diagnosed. Lumbar puncture revealed practically negative fluid.

On the fourteenth day the child suddenly became worse, respirations were 30, Cheyne-Stokes in type; pulse was 124. The extremities were flaccid, pupils contracted and reactionless. Incontinence and coma developed. Lumbar puncture revealed slightly cloudy fluid, containing polynuclear leukocytes and streptococci.

Autopsy cleared up the clinical picture. It showed

(4) Interstate Med. Jour., January, 1916.
(5) Ann. Otol., March, 1915, p. 25.

that there had been a purulent tonsillitis, a retropharyngeal and suprapharyngeal abscess which worked upward destroyed the bones at the base and spread out over the floor of the left posterior fossa, forming a large subdural abscess. Nothing pathologic could be seen in the pharynx. It would be difficult to say whether the condition gravitated from above downward or ascended from the tonsils. The anatomist had the final say and suggested that the latter was the more probable theory.

Death from Hemorrhage Following Peritonsillar Abscess. Carmody and Finnoff[6] report a death from hemorrhage following peritonsillar abscess. They describe their method of opening a peritonsillar abscess. This method gives drainage through the normal channel and the one through which the abscess usually discharges spontaneously if allowed to rupture. If the abscess is in the supratonsillar fossa, as occurs in 95 per cent of these cases, drainage is much better than at the usual point of drainage when the knife is used.

This operation is performed preferably with angular forceps, but may be accomplished with a straight forceps. The instrument is introduced from the opposite side of the mouth with the point extending between the anterior and posterior pillars at their junction and between the plica and the tonsil and forced upward, outward and backward, thus entering the supratonsillar fossa where it will most likely encounter pus. If the forceps is then opened and withdrawn the pus will be seen to follow between the blades and will continue to discharge through this channel. One may, however, fail to find pus in the supratonsillar fossa, and in this case the forceps should not be withdrawn, but made to sweep down into the posterior fossa, and failing to find it there, into the anterior fossa, but this latter is seldom necessary.

The advantages of this method are, according to the authors:

1. The opening is made at the actual point for drainage, *i. e.*, at the most dependent portion of the abscess.
2. The opening can be made wide enough so as to close easily.
3. No muscle fiber or mucous membrane is cut.

(6) Colorado Med., September, 1915.

4. A dull instrument is used and there is no danger of wounding a vessel.

The objections to the knife are that the operator may wound vessels, or cut a large amount of muscle tissue, so that the resulting scar will interfere with the action of the palate or give insufficient drainage.

Injury to Soft Palate and Uvula in Tonsillectomies. The author, J. A. Thompson,[7] noticed in several cases post-operative injury to soft palate and uvula after an apparently satisfactory operation in which the uvula had been pushed aside and care taken to avoid such complication. A snare was used on the base. He discovered the reason later when he noticed the tear beginning posteriorly along the posterior pillar where there were strong adhesions. Removing the snare and severing or dissecting the tonsil further allowed the tonsil to be removed without tearing the mucous membrane.

Post-Operative Antiseptic Treatment of the Tonsillar Fossae. G. P. Marquis[8] advocates the use of 25 per cent. tincture iodine applied to the tonsillar fossae immediately following a tonsil operation. After experimenting with more than 100 cases he found less reaction and soreness, less bacterial positive cultures than with the control cases.

[This observation has been verified by numerous observers.—Ed.]

THE ESOPHAGUS.

Foreign Bodies Removed from Bronchus and Esophagus. J. S. Fraser[1] says in his final remarks: "At first sight it would appear that bronchoscopy was a more serious procedure than esophagoscopy, but it is not. In view of the septic condition of the lining membrane of the gullet and of the danger of mediastinitis following injuries of the esophagus, it is advisable to exercise great care in the after-treatment of patients who have had esophagoscopy performed—especially if there has been any injury of the wall of the gullet caused by the

(7) Lancet-Clinic, Jan. 22, 1916.
(8) Jour. Amer. Med. Ass'n., July 10, 1915.
(1) Edinburgh Med. Jour., December, 1915.

foreign body itself, or by the manipulations of the surgeon."

Diseases of the Esophagus Studied by Aid of Esophagoscope. W. Lerche[2] urges an early examination by means of the esophagoscope of all patients who complain of disturbance of deglutition in order to make an accurate diagnosis. He concludes that a local neurosis is present in every case of anatomic lesion at some time, and the direct examination must be made in order to say whether or not a lesion exists.

Angioneurotic Edema of the Esophagus. H. Arrowsmith[3] reports an interesting case, in which the patient complained of dysphagia and odynophagia. Esophagoscopic examination revealed a well-defined mass and malignancy was thought of. The patient was later seen by Jackson and Plummer respectively and this mass was not visible. She continued to have signs of angioneurotic edema elsewhere upon the body.

An Unusual Case of Perforated Ulcer of the Esophagus. G. W. Christie[4] reports a case of acute perforation of the esophagus just above the cardia which was diagnosed as gastric perforation. The belly was opened and found negative. Three hours later, respiration became markedly embarrassed and the patient died. Necropsy showed a hydrothorax and collapsed left lung. The fluid contained gastric contents.

Pulsion Diverticulum of the Esophagus: A New Operation for its Cure. Gaub and Jackson[5] have used the following technique in operating for pulsion diverticulum in two cases with good result.

Anesthesia:—Ether, intratracheal insufflation. This removes the anesthetic from the field of operation.

Technique:—"The external part of the technique does not differ materially from the classical operation. It may be well, however, to remind the surgeons of the following points:

"1. The landmark to bear in mind is the cricoid cartilage.

"2. A large vertical extent of the wound must be

(2) New York Med. Jour., June 19, 1915.
(3) Laryngoscope, March, 1915, p. 156.
(4) Lancet, July 3, 1915.
(5) Surg., Gynec. and Obstet., July, 1915.

maintained and kept clean and dry by careful hemostasis at all stages of the procedure.

"3. The cricoid cartilage and subjacent rings of the trachea must be seen and identified.

"4. The esophagus will be discovered posteriorly to the cricoid and trachea as a thin flat fold pressed against the cervical vertebrae.

"In the new operation, having exposed the esophagus, the surgeon asks the esophagoscopist to push out the diverticulum into the external wound. The surgeon seizes the bottom of the pouch with forceps. He then asks the esophagoscopist to insert the esophagoscope into the subdiverticular lumen of the esophagus. The surgeon then amputates the redundancy, being careful not to make undue tension in order to determine with precision the amount of tissue which really constitutes redundancy.

"Closure of the wound, dressing, and after-care do not differ after this procedure from that of the usual operation."

Thyroglossal Cysts: C. B. Burke[1] reports a case of thyroglossal cyst which had passed through the hands of several physicians before a diagnosis was made. He points out that the tumor which forms in the thyroglossal duct must appear in the midline between the foramen cecum and the isthmus of the thyroid, usually firmly fixed to the hyoid bone. Such tumors are slow-growing, usually painless, imparting a fluctuating sensation on palpation, freely movable from side to side, and resistant to traction forward. They give no shadow on transillumination.

The treatment is excision.

TUBERCULOUS GLANDS.

Non-Surgical Treatment of Tuberculous Glands. This subject is discussed by A. F. Holding.[2]

Although much is said in medical literature about the surgical treatment of tuberculous adenitis, relatively little is said about other therapeutic measures.

"Kuepferee has shown in animals that tuberculous

(1) Med. Record, June 19, 1915.
(2) Med. Record, March 11, 1916.

granulations have been controlled by Roentgen treatment inducing a peripheral round-celled infiltration and the substitution of fibrosis in place of active tuberculous lesions. In caseous glands, or those that have begun to break down in the center, pus formation is hastened by the roentgenization so that the lesion rapidly increases in size. Unless forewarned, the patient usually becomes frightened at this, thinking that the glands are being made worse by the treatment. They soon 'point,' and after incision and evacuation of the pus these cases usually progress uninterruptedly to cure.

"The best results are obtained in advanced caseous lesions or those in which sinuses have formed."

Tuberculous glands are classified by Holding as follows:

I. Hyperplastic type.
II. Caseous or purulent type.
III. Ulcerated or fistulous type.

In Holding's series, sixteen cases were classified under the first class. Of these, three patients became symptomatically well; two were improved, relapsed later and again improved under a course of treatment; five disappeared from observation; five improved and later submitted to operation; one was unimproved.

In Class II there were twenty-three cases. Nineteen patients became symptomatically well; ten disappeared from observation; three were unimproved.

In Class III there were thirty cases. Twenty-five of these patients became symptomatically well; five disappeared from observation.

The Coolidge tube is used in administering the treatment because one can measure the dose.

"If the dose is limited to 15 x Kienbock, no disagreeable skin symptoms will follow."

Holding formulates the following conclusions:

"1. The efficacy of *x*-ray treatment in tuberculous adenitis has been demonstrated in surgical clinics, over 1,500 successful cases having been reported.

"2. The surgical treatment which was orthodox before the discovery of the *x*-rays and their therapeutic value is still advised by large numbers of the medical profession.

"3. Non-surgical methods, including the *x*-rays, deep hyperemia and tuberculin, should be tried before any case is submitted to radical operation."

SORE THROAT.

Milk-Borne Septic Sore Throat. H. M. Biggs[3] describes an epidemic occurring in New York which was traced to the milk supply, the long chain streptococcus being the offending organism.

[This is an addition to the literature on this condition which was first reported in 1909. Several reports from various parts of the country seem to confirm the observation of the well-known Boston outbreak.—Ed.]

The Early Diagnosis of Streptococcus Sore Throat, and the Effect of Vaccines in its Treatment. In regard to this subject, R. R. Mellon[4] draws the following conclusions:

1. An early examination of cultures from acute sore throat is valuable because it precludes an overgrowth by contaminating organisms, and because it often gives a clue to the virulence and toxicity of the infecting agent.

2. Although of advantage in acute and subacute cases, it is of no value in chronic ones.

3. Our ideas as to what constitutes a normal mouth and throat must undergo revision. Because one does not have any condition in the oral cavity which causes pain is not proof of the bacteriologic normality of that cavity. His tonsils make him a streptococcus or diphtheria carrier, just as surely as one who harbors the typhoid bacillus is a carrier of that organism. It is now well known that streptococci may develop a focus in the gums and around the roots of the teeth, as well as in the tonsils.

4. Examinations of the oral cavity should look to a more careful interpretation of the organisms found there. If the work is done with the adherence to the limitations above mentioned, valuable information may at times be derived. The relation of hemolytic cocci to the arthri-

(3) Med. Record, Dec. 4, 1915.
(4) Medical Record, May 15, 1915.

tides and the *S. viridans* and the pneumococcus to endocarditis (Rosenow) necessitates the use of blood agar for this work, as it affords a ready clue to that particular member of the group with which we have to deal. In the chronic cases cultures of material from the crypts and animal inoculation may often clear up the diagnosis of many so-called cryptogenic infections.

5. The acute cases of streptococcus sore throat respond very quickly and decisively to a vaccine of proved immunizing powers.

Vincent's Angina. The author, J. Harper,[5] reports three cases of refractory sore throat which responded eventually to treatment after a bacteriologic diagnosis of Vincent's angina was made. The treatment consists in rest in bed, strong purge, painting lesion with perchloride of mercury 1 to 1000, and daily swabbing the lesion with silver nitrate 60 grains to the ounce.

The lesion is often mistaken for diphtheria or syphilis clinically. The constitutional symptoms may seem out of proportion to the lesion or they may seem slight for the extent of the lesion. The condition does not clear up until both the fusiform bacillus and spirochete disappear culturally.

[It is a well known fact among those who make careful bacteriologic examination from throat lesion smears, that the organisms purported to be pathognomonic of Vincent's angina are frequently found. In tuberculous, syphilitic and malignant lesions it is rather unusual not to find them present. The question arises: Is Vincent's angina a clinical entity, or is it a secondary saphrophytic infection?—Ed.]

Twenty-five Cases of Vincent's Angina Successfully Treated with Sodium Perborate. H. H. Stark[6] in the first part of his article calls attention to the fact that Vincent's angina is dealt with very superficially in text-books, and in view of the fact that the condition is not uncommon when a bacteriologic examination is made, believes that the condition deserves a more prominent place in text-books and literature.

He has obtained satisfactory results by using sodium

(5) Glasgow Med. Jour., July, 1915.
(6) Ann. Otol., March, 1915, p. 48.

perborate. "The perborate splits up in the mouth, forming nascent peroxide of hydrogen." It can be prescribed in powder, two teaspoonfuls dissolved in a glass of water, used as a gargle frequently. The pain and discomfort respond quickly, surprisingly so, he claims.

DIPHTHERIA.

Diphtheria Endotoxin in Persistent Diphtheria Infection. R. T. Hewlett[7] reports that twenty-four cases of persistent diphtheria infection have been treated with endotoxin with a disappearance of the bacilli in a reasonable time in seventeen; in one the bacilli did not disappear until seventeen days after the last dose of endotoxin, and in six the treatment was unsuccessful. In no case has any untoward effect been noticed. The endotoxin is injected into the muscle of the upper arm or back and gives rise to some pain, tenderness, and swelling lasting a day or two, at the site of the injection, and occasionally to some malaise, rash and rise of temperature. Hewlett believes that the results warrant further trial of the endotoxin.

Intradermic Diphtheria Toxin Test. It has been known for some time that a certain percentage of persons have antitoxin to diphtheria in their blood, and that only those individuals whose natural immunity is low, or who have no natural immunity whatever, are susceptible to the disease. Shick conceived the idea of using diphtheria toxin in the manner employed by von Pirquet for the use of tuberculin and found that individuals who reacted to the toxin were susceptible to diphtheria while those giving negative tests were immune.

E. E. Moody[8] reports the results of the Shick test in a large number of individuals and concludes as follows as to its value:

The test is of definite clinical value in differentiating between persons who are susceptible to diphtheria and those who are not susceptible, and is therefore useful in determining which cases, of those to be placed in an

(7) Lancet, Feb. 6, 1915.
(8) Jour. Amer. Med. Ass'n., April 10, 1915.

environment where the liability to exposure is great, should be immunized.

It is of value in differentiating between clinically doubtful cases of diphtheria, positive reactions being obtained in clinical cases, negative reactions in carriers.

It is useful in experimental work in determining the effects of various forms of immunization and the duration of immunity conferred by these methods.

It has a definite value in the handling of diphtheria epidemics in institutions.

The Shick Reaction. H. M. Bundesen[9] reports 800 tests with the Shick Reaction from which he concludes:

By means of the Shick test we are in a position to tell definitely who is susceptible to diphtheria and when an epidemic breaks out can inject those and those only, paying no further attention to persons giving a negative reaction.

By this means the danger of cross-infection is greatly decreased. Children with diphtheria who have had scarlet fever and are therefore immune from scarlet fever can be placed in scarlet fever wards when the inmates yield negative Shicks, etc.

It permits a great reduction in antitoxin bills. Much needless pain and annoyance of patients is avoided, and the possibility of anaphylactic shock is greatly minimized.

Bundesen describes the technique as follows:

The skin of the flexor surface of the forearm (upper one-third) is prepared by cleaning with tincture of green soap and 95 per cent. alcohol. With the thumb and first finger of the left hand a small portion of the skin is pinched up and the needle carefully inserted into, but not through, the skin so that the opening in the point of the needle can be seen beneath the superficial layer.

A dilution of a fresh standard diphtheria toxin is made of such a strength that 0.1 c.c. contains 1/50 of the minimum lethal dose for a 250-gm. guinea-pig, and this is injected, pressure being exerted in an upward direction. If the injection has been properly given, there is to be seen at once a white bleb-like elevation which persists for several minutes and is distinctly studded

(9) Jour. Amer. Med. Ass'n., April 10, 1915.

with little pits corresponding to the openings of the hair follicles.

C. F. Lynch[1] in a short, clear article expounds the philosophy and physiology of the so-called Shick reaction for immunity to diphtheria.

All know how difficult it is in certain cases to make either a clinical or bacteriologic diagnosis of diphtheria, and in such cases, especially where the patient has previously had injections of antiserum either as a prophylactic or therapeutic measure, one hesitates to give antitoxin because of the danger of anaphylaxis or the less dangerous but severe serum reaction.

It was evident that certain individuals were immune to diphtheria but it remained for Shick to give a practical method of determining those who were immune.

He found that this could be done "by injecting a diluted solution of a standardized diphtheria toxin into the skin tissue; the injection being of such strength that 0.1 c.c. represents 1/50 of the minimum lethal dose for a 250-gram guinea-pig."

A syringe should be graduated into 0.1 c.c. and a fine needle used. The site of the injection is preferably the flexor surface of the arm which has previously been cleaned with soap and water and alcohol. The needle is inserted *into* the skin, *not through* it, so that the point shows through and on injecting 0.1 c.c. a small bleb-like elevation appears which disappears in the course of a few minutes.

A *positive reaction* is apparent at the end of 24 hours showing a lesion slightly swollen, surrounded by a reddish-colored inflamed zone. This reaction increases in severity for 48 hours and then gradually fades away, leaving a reddish-brown pigmentation; later desquamation takes place. There is central induration at the point of injection which is quite characteristic.

A *negative reaction* gives no noticeable change after 24 hours.

A positive reaction means that the patient is not immune, or at least that there is no antitoxin in the blood.

(1) Clinical Medicine, August, 1915.

The negative reaction means that patient is immune.

The author advises the intramuscular injection of antitoxin in the treatment of diphtheria.

[The test has been found very useful in control of epidemics in hospitals and private practice and can be recommended as reliable.—Ed.]

C. Graef and G. Ginsberg[2] give the following advantages to be gained by using the Shick test:

1. The use of immunizing doses of antitoxin will not be necessary if persons exposed to infection are found to be naturally immune.

2. Even when bacilli are found in the throats of such persons, no injection of antitoxin need be given when they suffer from tonsillar or other pharyngeal infections.

3. Nurses in institutions, when proved immune, can safely care for diphtheria patients while susceptible nurses are kept away and employed on other cases.

3. Much aid can be had in solving the puzzle of why one patient recovers without antitoxin while the next, apparently an exact counterpart, dies in spite of the use of this valuable remedy.

The authors report a series of tests from which they draw the following conclusions:

1. The most susceptible age is between 1 and 5 years.

2. Immunity obtained by having the disease or by the use of immunizing doses of antitoxin lasts from a month to several years, varying greatly in different individuals and being very brief in children.

3. The Shick test is a helpful agent in testing the efficiency of immunization by antitoxin as well as the natural immunity existing in many persons.

4. It has helped to place on more certain grounds the assurance that bad cases of diphtheria should receive early and large doses of antitoxin by intravenous injection. Antitoxin is ten times as effective when so used, as compared with the ordinary method of administration.

---

(2) Jour. Amer. Med. Ass'n., April 10, 1915.

5. Park has obtained results in families showing a striking similarity in reactions to the test. If the youngest child of a family has a negative reaction, all the older children are likely to be negative, and if the older children are positive, the younger ones are also. When variations are found, the younger children show the positive reaction.

The following conclusions are drawn by Levinson and Blatt[3] in their studies of the Shick reaction.

1. The Shick reaction is valuable in dispensary, as well as in private practice.

2. One should wait at least twenty-four hours before deciding whether a Shick reaction is positive or negative. The examination should be repeated the following twenty-four hours, and if possible also several days later. This, of course, diminishes somewhat the value of the Shick test as a diagnostic measure in urgent cases of diphtheria.

3. While a positive Shick reaction does not necessarily mean that the disease in question is diphtheria, antitoxin should be given in all cases showing a positive Shick reaction upon exposure to diphtheria.

4. Our series of cases showed a percentage of negative Shick reactions ranging from 61 per cent. to 78 per cent. This would seem to indicate that a very high percentage of children possess natural immunity to diphtheria. The administration of antitoxin can, therefore, be eliminated in a great many cases if the Shick test is applied.

5. The Shick reaction, as a rule, is negative in children under six months of age, frequently also in children under twelve months. Susceptibility, however, increases with increase of age.

6. Sex exerts very little influence on the Shick test.

7. Diseases other than diphtheria have no effect on the Shick reaction.

8. Tuberculin tests, as well as tuberculin treatment, exert no influence on the Shick test.

(3) Archiv. Diagnosis, July, 1915.

THE TRACHEA AND BRONCHI.

Diagnosis and Removal of Foreign Bodies in the Trachea, Bronchi, and Esophagus. The symptoms of foreign body in the respiratory tract are principally, says R. L. Moorehead,[6] cough and dyspnea. The history is important. Did the cough start suddenly? The *x*-ray is of greatest aid in diagnosis but physical signs must be looked for.

With a diagnosis of foreign body, there is no contraindication for operation. Anesthesia is not necessary under ten years of age. One should not continue searching for a foreign body after forty-five minutes but should give the patient a rest of thirty-six or forty-eight hours.

Total Extirpation of the Trachea for Carcinoma. Two cases of total extirpation of the trachea are reported by J. Soerensen.[7] The report is unique in that the author ingeniously uses skin flaps to form a new trachea. Rubber-dam tissue is used in the early postoperative stage. Great care must be exercised in removal of the trachea to avoid injury to the recurrent laryngeal nerve. In one case, the nerve was injured on one side and the patient remained hoarse. The final result was gratifying. The original article will bear careful study for those interested in such work.

Position of Trachea in Tuberculosis: Webb, Forster, and Gilbert,[8] who have been heard from before, suggest that in each examination for tuberculosis the position of the trachea be palpated by use of the thumb below the thyroid isthmus. The trachea should be centrally located in normal individuals. In a series of 100 cases they found that the trachea was placed to the side on which the lung was more involved in sixty-nine cases, doubtful in nineteen and to the opposite side in twelve cases.

Report of a Case of Esophago-Tracheal Fistula. Finkelstone and Ellis[9] report an interesting case of congenital esophago-tracheal fistula in a new-born full-

(6) Long Island Med. Jour., October, 1915.
(7) Archiv. f. Laryngol. u. Rhinol., No. 2, 1915.
(8) Jour. Amer. Med. Ass'n., Sept. 18, 1915
(9) Jour. Amer. Med. Ass'n., Jan. 18, 1915.

term infant. Sixty-four such cases have been reported. The prognosis is hopeless.

Thyroglossal Duct.

Cancer of the Upper Air Tract, with Special Reference to its Treatment with Radium. W. Freudenthal[1] reiterates that in an operable case the patient should be operated on. Radium in such cases is an aid to surgery.

In inoperable cases Freudenthal prefers the intratumoral application of radium. In the larynx careful observations must be made for signs of reaction. Tracheotomy seems to cause a rapid extension.

THE LARYNX.

Treatment of Chronic Laryngitis. The treatment of chronic laryngitis is discussed by G. A. Aschman[2] as follows:

When the diagnosis of chronic laryngitis has been established, and after the removal of any existing causal factor, the first order must be rest—the more complete, the better. The treatment, consisting in topical application of remedies, is easily accomplished with the improved apparatus of the day. Compressed air and sprays can be made to apply medicaments to the interior of the larynx with ease and efficiency. Various medicated sprays—as recommended by Lennox Brown, Shurly, Ballenger and others—will cleanse and disinfect the larynx as well as produce astringent, sedative stimulant, or tonic effects. If the spray is thrown through a long tube with a properly curved top, as in the Davidson and De-Vilbiss instruments, the medicament enters directly into the larynx. The compressed air and hand nebulizer produces a vapor which can be inhaled not only into the laryngeal cavity, but into the bronchi and lungs also. Chloride of iron, half a drachm to the ounce of water, chloride of zinc and a solution of alum, 30 grains to the ounce, are favorite

(1) New York Med. Jour., July 3, 1915.
(2) West Virginia Med. Jour., October, 1915.

prescriptions. Mayer recommends in the more chronic conditions the following:

℞
Iodine ..... grs. viii
Potassium iodide ..... grs. xvi
Glycerine .....
Water ..... aa. ʒiss. or oz. iss.

Steam inhalation, especially with the resinous substances such as are contained in the compound tincture of benzoin, are especially soothing and relieve much of the irritation. But one should be very careful in advising their use, as they may render the larynx more sensitive to the effects of cold and other irritating influences. So they should only be prescribed when the patient remains in the house and never while he is going about attending to his daily occupations.

The application with atomizer or nebulizer by the patient himself, twice or more a day, of eucalyptol, camphor-menthol, oil of cubebs, etc., in lanolin, albolene or pinoleum is generally helpful. When much irritability exists, with a hacking cough, copious secretions and expectoration, Aschman has found inhalations of a 5 to 10 per cent. solution of camphor-menthol in albolene to be effective. These inhalations should be taken through the nebulizer and not in the form of a coarse spray.

If erosions are discovered, the dioxide of hydrogen, diluted one-half with water at first, is sprayed upon them; then europhen should be sprinkled over them, but in very minute quantity so as not to produce a renewed coughing spell. Aristol or iodoform is preferred by some, tannin and alum by others.

Only when the thickening of the mucous membrane is considerable, or a granulated condition has developed, are topical applications called for. With the cotton-tipped carrier, alum in a 2 per cent. solution, zinc sulphate 1 per cent., nitrate of silver or any of the new silver preparations, according to the indications in each case, can be conveniently applied.

Counter-irritants to the outside, like mustard and tincture of iodine, are sometimes serviceable.

Cold baths every morning may be advised in robust

and full-blooded patients if they can stand the shock and reaction sets in properly; if not, cold sponging of the upper part of the body, followed by towel-friction, should be resorted to. Often a complete change of air and surroundings, if possible, especially a week or longer at some sea-coast resort under favorable weather conditions, is always of great benefit. While we all generally recognize the importance of plenty of fresh air in the bedroom, care should be taken that a patient with an irritable throat sleeps not too close to an open window. In fact, it is best to ventilate through an open door in an adjoining room.

Finally, the correction of faulty methods in vocalization, the wearing of proper clothing, regularity as to meals and regulation of the bowels are essential adjuvants in the cure and prevention of recurrence of chronic laryngitis.

Congenital Diaphragm of the Larynx. G. B. New[3] reports an unusual case of this congenital formation occurring in a male, 27 years of age, well-developed and healthy. There was no family history of similar conditions; no history of any acute condition of the upper air-passages. There had been hoarseness from birth with no apparent change in the voice. The patient had slight difficulty in breathing on exertion, as in running upstairs. Examination of the larynx showed a thin membrane extending between the margins of the true vocal cords for two-thirds of their extent anteriorly with a clean-cut concave margin toward the lumen of the glottis. The membrane was pale gray in color, gradually fading into the margin of the cords which were rounded and slightly reddened. The membrane appeared thinnest in the median line and at its free margin. It did not present an appearance of scarring, and the larynx was otherwise quite normal. During phonation, the membrane between the cords almost completely disappeared, although enough remained to prevent the approximation of the cords. In the examination of the eyes, ears and nose no other abnormalities were found, the Wassermann test was negative.

The diagnosis of congenital diaphragm of the larynx

(3) St. Paul Med. Jour., February, 1915.

was made because (1) the history of hoarseness since birth; (2) the absence of any previous illness which might cause such a condition; and (3) the appearance of the diaphragm and the otherwise normal larynx.

Operation: With a laryngeal knife the diaphragm was split down the center from the free margin to the anterior commissure. As the knife approached the interior commissure it met with marked resistance on account of the increase in thickness of the membrane. Although measures were taken to prevent it, adhesions of the cords at their anterior part occurred. After reaction from the operation had cleared up, the patient's voice became slightly improved and he noted that he could breathe with greater ease.

New states that the results of the treatment of these conditions have, as a rule, been unsatisfactory because the raw surfaces of the interior commissure heal together. Improvement in the voice is not usually marked, although the patients notice the increased ease with which they breathe.

Papilloma of the Larynx. T. Hubbard[4] reported five cases of laryngeal papilloma and advocated curettement from below with head bent back. He prefers this method to that of Clarke, who puts the larynx at rest for a long period by tracheotomy. He further advocated violent massage of the larynx and muscles as the muscles have been under considerable tension because of the unusual effort in breathing.

In the discussion which followed this paper, J. Payson Clark said that he could not agree with Hubbard. He objects to long tracheotomatizing and has seen no bad results so far as function of the larynx is concerned.

E. Fletcher Ingals objected to curettement without being able to see what structures are being curetted.

Lewis Coffin reported a case in a woman in whom the growths disappeared completely after two applications of radium.

Dr. Lynch advocated the use of the suspension apparatus and instruments by means of direct laryngoscopy. He has had sixteen successful cases.

(4) Trans. Amer. Laryngol. Ass'n., 1915, p. 52.

Prolapse of the Ventricle of the Larynx. G. B. New[5] reports two cases of prolapse of the ventricle of the larynx in two men. The complaints were coughing and gradually increasing hoarseness over a period of from three to five years. One patient did not submit to operation. In the one who was operated on, a good result was obtained by grasping the tumor mass with a Brünigs forceps and removing the tumor with a snare. The voice was immediately restored. Complete removal is the only cure for the condition.

Laryngeal Tuberculosis. In a paper on this subject Joseph B. Greene[6] formulates the following conclusions:

1. The diagnosis of laryngeal tuberculosis should be made early, an end obtained only by systematic and periodic examination of the larynx of all tuberculous patients.
2. The prognosis is far less serious than the profession has been accustomed to think.
3. In the treatment we should regard prophylaxis.
4. The injection of the internal laryngeal nerve with alcohol for the relief of pain marks a distinct advance in the treatment of this condition.
5. Of the drugs recommended in the treatment our main reliance is still placed on lactic acid and formalin.
6. The surgical treatment consists mainly in the removal of the epiglottis when its diseased condition requires it, and the use of the cautery in selected cases.

Laryngeal Tuberculosis. Laryngeal tuberculosis is the most frequent complication of pulmonary tuberculosis occurring in 50 per cent. of all cases of pulmonary tuberculosis coming to autopsy. Clinically, says M. F. Lent,[7] it can be recognized in from 15 to 30 per cent. of cases. In a series of 1,598 cases in girls and women, 18 per cent. or 286 cases, showed clinical signs of laryngeal involvement.

The subjective symptoms are variable but "slight changes in voice, or a sense of vocal fatigue; slight tickling or dryness of the throat; frequent clearing of the throat; perhaps a temporary loss of voice" in suspected

(5) Laryngoscope, March, 1915, p. 145.
(6) Southern Med. Jour., November, 1915.
(7) Med. Record, March 4, 1916.

patients call for a careful laryngeal examination. Pain and dysphagia are late symptoms and usually are caused by ulceration of the epiglottis, of the pharyngeal surface of the arytenoids or of the posterior commissure.

Hope lies in an early diagnosis. "A unilateral swelling or hyperemia of either vocal cord, more frequently the posterior portion, or one of the ventricular bands is very suggestive of a tuberculous infection." A tuberculous infiltration of the posterior commissure is probably found more often than in any other portion of the larynx. A partial paralysis of one cord is a common finding.

In order of frequency, the areas involved are "posterior commissure, vocal cords, arytenoid cartilages, ventricular bands, aryteno-epiglottic folds, epiglottis, subglottic space."

Simple catarrhal laryngitis occurs in some cases, but can be seen to be bilateral usually. Posterior wall thickening in tuberculous lesions is more prominent and less smooth than in simple cases.

Strict measures must be carried out, *e. g.*, no use of the voice, even in a whisper; prohibition of alcohol, tobacco, etc.

The various local treatments are of benefit if well directed. The constant use of cocaine for relief of pain must be avoided. Orthoform insufflated within the larynx before meals affords great relief.

The prognosis not so grave as generally conceded.

Laryngoscopy. C. B. Broder[8] uses no anesthesia in children with good results. He reports eleven cases.

J. M. McCurry,[9] in an article on partly swallowed harmful foreign bodies, warns against the use of purgatives and emetics.

Bronchoscopy and esophagoscopy can be relied upon, he says, and no heroic treatment is necessary.

[Unless the foreign body be lodged in the larynx in which case a tracheotomy should be performed first, before any attempt is made to remove the foreign body. —Ed.]

Suspension Laryngoscopy and Its Accomplishments.

(8) New York Med. Jour., Sept. 11, 1915.
(9) Memphis Med. Month., August, 1915.

After considerable experimenting with the original Killian suspension apparatus for direct laryngoscopy, R. C. Lynch[1] has devised improvements which he thinks have proved very advantageous. The mouth-piece is a tripod arrangement thus avoiding annoying slipping, and increasing the vertical diameter of the field. The gallows has been strengthened and constructed into a reverse L-shaped instrument which can so be adjusted that after Lynch's spatula, which is longer and wider, has been placed in position, the neck line is horizontal, thus insuring a better view of the anterior commissure. The spatula is placed on the laryngeal surface of the epiglottis thus holding this usually troublesome organ out of the field.

Besides these improvements he has had made certain instruments for operating upon the larynx.

[Various instrument houses now carry a full line of these instruments.—Ed.]

Defects of the Singing Voice Due to Nasal and Accessory Sinus Disease. J. J. McLoone.[2] This author points out that the accessory sinuses must be thoroughly ventilated in order that clear, perfect head tones may be accomplished.

He emphasizes the importance of careful nose and throat examination by competent men; in students undertaking a vocal education.

Vocal Strain from a Laryngologist's Standpoint; Its Causes and Prevention. In addressing the Speech Art Society, W. A. Wells[3] summarizes the general principles of vocal strain prevention as follows:

1. Avoid excessive use, observe implicitly the warnings of fatigue, and give the necessary opportunity for repose and restoration of the functions.

2. Avoid wrong methods of using the voice, which can be generally recognized by the fact that they require cramped, unnatural positions of the throat and are quickly followed by fatigue.

3. Avoid using the voice when the throat is inflamed from a "cold," and have removed without delay any

(1) Trans. Amer. Laryngol. Ass'n., 1915, p. 323.
(2) Jour. Amer. Med. Ass'n., July 24, 1915.
(3) Southern Med. Jour., December, 1915.

local troubles in the nose or throat which hinder effective vocalization.

4. Observe all general hygienic laws, and seek to maintain a healthy condition of the organism.

Some Common Voice Troubles in Singers. In a convincing article, I. W. Voorhees[4] expounds some of the conditions in the upper respiratory tract which affect the singing voice.

He begins by saying: "Voice, which may be looked upon as a resultant of highest efficiency which our combined special senses are capable of, is one of the most important of all our body functions. In singing, and to a less extent in speaking, the whole body must be used to secure artistic and persuasive effects." In obtaining and maintaining the desired effects it is necessary that the environment be clothed in moderation in all respects, eating, drinking, working, sleeping, etc.

Usually the reason that singers consult a physician is for what they call "catarrh." After careful examination one may or may not find the real cause. It is necessary to observe the patient frequently in some cases. The causal factors begin in the nose and throat and later involve the larynx, trachea and bronchi. It is unwise to direct treatment at the larynx when the causal factor lies in the upper air passages.

Head resonance is such an important factor in good singing that the rhinologist must make a special effort to detect the causes of interference. There may be a difference in resonance in the two sides of the nose which is easily detected by having the patient hum with one side closed. Turgescence and soft hypertrophy are important factors, and it is a mistake to advise operation without trying out conservative treatment. Anterior septal deviations or deviations causing a sinus to become congested because of diminished physiologic drainage are important factors which interfere with "placing" head tones. A septal perforation is a cause of impaired resonance. "Only in case of urgent necessity should a turbinate be removed." The middle turbinate is especially important in singers.

(4) Medical Record, May, 1915.

Pharyngitis lateralis is the most important condition in the pharynx because of the thickness it interferes with the action of the stylo-pharyngeus and predisposes to fatigue of larynx.

Lingual tonsil hypertrophy may be the cause of cough and interferes with the action of the muscles.

The influence of diseased faucial tonsils is well known. If the condition does not respond to treatment then the tonsils must be removed.

Singers should not use the voice during an acute upper respiratory tract infection, especially a laryngitis. Tracheitis is not uncommon.

"While the ears need not be perfect for the reproduction of a melody, any unbalance in tone appreciation may cause the artiste to sing off pitch." Impacted cerumen with non-suppurative middle-ear conditions are most frequent causal factors.

It is quite easy for the laryngologist with a good ear to become quite expert in detecting faults. He should work in coöperation with the voice teacher. Proper training in the correct use of the voice is the most essential factor if one is to become a good singer.

"Every correctly placed tone must take origin in the larynx. Sail gently upward as far as the soft palate, and there divide, part going into the nasal cavities, part against the hard palate and teeth as directed by the tongue."

Good tone is not produced without setting into vibration the entire body. One should never sing out of his particular range, because it puts a strain on the larynx.

As a warning to physicians who have occasion to treat singers, Voorhees suggests that all therapy be well considered before instituted, as the patients may be just in the period when they are about to loose their singing voice for no especial reason. This is not infrequently the case.

"The vocal apparatus in singers is a very fine and fragile mechanism, which requires careful and delicate treatment. To attach it with caustic agencies is comparable to oiling a watch with wagon grease."

Operative interference should be the last resort. Voorhees recommends tannin 10 per cent. in glycerine or

protargol. The voice should not be used for two hours after any application.

Every case must be studied individually.

The Vocal Apparatus in Children. Weinberg[5] in the course of medical inspection of the schools at Stockholm, paid special attention to the vocal organs and the hearing. He reports the details of his study of fifty boys and fifty girls from each of the eight classes of a public school. The ages ranged from seven to fourteen. The work was undertaken to discover the causes of chronic hoarseness. None of the children had a vocal range of three octaves. The changes in the voice are tabulated from various standpoints under a piano keyboard, showing in particular the changes in the boys' voices at twelve and over, and the upward range of the girls' voices at fourteen. He found two types of mutation in boys: a stormy, catarrhal form of change of voice, and a dry form. Only 34.7 per cent. of the children were free from hoarseness in speaking and 40.3 per cent. in singing. All the 65.3 per cent. who were more or less hoarse were examined with the laryngoscope. In one hundred and twenty-seven boys and eighty-nine girls chronic changes were found in the throat sufficient to explain the hoarseness—that is, in 27 per cent. of the total eight hundred.

Stammering.

Stammering and Its Relation to an Enlarged Thymus. In 1910 William Browning advanced the hyopthesis that stammering is associated at the start with the presence of an enlarged thymus, if not directly caused thereby. The subsequent study of twenty-five consecutive cases of stammering has tended to confirm this hypothesis. The histories of these cases and a complete analysis of the entire subject have been presented by W. Browning[6] in an interesting and practical paper.

The very multiplicity of the theories that have been

(5) Hygiea, vol. 77, No. 5.

(6) Neurographs: A Series of Neurological Studies, Cases, and Notes. Edited by William Browning, Thymus-Stammer Number, Vol. 1, No. 4. Albert T. Huntington, 1915. (Medical Record, Sept. 4, 1915.)

proposed to explain the origin of stammering indicates how little is actually known about this condition. These theories regard stammering as an inherited weakness of the mechanism of speech, a developmental neurosis, an infective neurosis, an anxiety neurosis or fright inhibition, a disturbance of the cerebral or cortical speech centers, a transitory auditory amnesia, a spastic incoördination neurosis, an ataxia of the speech mechanism, an associative aphasia, a mental tic, a disturbance of the will, a psychosis, a diseased state of the mind, etc. Browning cites numerous facts to show that stammering is not primarily a brain trouble. The subjects have shown as a rule abnormally acting speech mechanism. The condition develops at a certain period of life and practically never after youth. Stammerers may still be able to enunciate correctly in a singing or often in a whispering voice. Stammering is frequently recovered from and is rarely seen in brain affections. It is far more frequent in males than in females, which would tend to exclude the rôle of timidity or of hysteria. There is no confusion of thought for "The wit of stammerers is proverbial." There is no evidence of brain disease.

Previous work has shown that conditions in and about the upper air-tracts are of great importance in the causation of stammering. Among the conditions associated with stammering there have been noted adenoids, hypertrophied tonsils, nasal intumescence, nocturnal enuresis, general hypotonia with bad bodily carriage, shallow upper chest, palpable glands, various forms of habit spasm, and cardiac defects. There is one condition, which, according to Browning, is constantly present in all stammerers, namely, an enlarged thymus or evidence of a block in the thymic area. This is a generalization that might be regarded as one of sweeping nature if it were not made by a careful observer. The facts upon which this generalization is based are fairly well established. Twenty-five consecutive cases that all show the same anatomic abnormality and associated conditions that may be correlated with it ought to satisfy the most exacting critic. Browning's patients ranged in age between 2 and 65 years. In all of them there was unmistakable evidence of thymic enlargement. This was revealed by

careful percussion. The charts accompanying the case reports show that this dullness corresponds to the upper half of the sternum and extends beyond its lateral borders, but more to the left than to the right. The dullness is relative rather than absolute, shades off gradually into the pulmonary resonance, and is usually continuous with the upper border of the heart. In some cases, usually in infants, or the very young, palpation may detect a portion of the thymus above the sternal notch. *X*-ray examination gives uncertain and inconclusive results. Prominence of the manubrium and an angulation at the junction of the manubrium and the body of the sternum have been noted by a number of observers. Dilated surface veins of the front of the chest are present in some cases of enlarged thymus, and are made prominent by exertion, excitement, or an ordinary cold. The relative immunity of females to stammering is attributed to the lesser frequency of thymico-lymphatism and the costal type of respiration.

The various conditions mentioned above which are associated with stammering are regarded as intimately related to the habit and as constituting with this a veritable "stammering diathesis or complex." The lymphatic hyperplasia, including the enlarged tonsils and adenoids so frequently found in stammerers, goes hand in hand with the thymic hypertrophy. Muscular hypotonicity is one of the most constant concomitants of stammering. Recent experiments place the thymus among the glands of internal secretion which depress muscular action. A large percentage of stammerers show distinct bony anomalies, as rachitis, scoliosis, retrognathism, and a tendency to over-growth, which fact seems to harmonize with the observation that lymphatism and the thymus are closely related to the processes of bony growth. Circulatory troubles and nasopharyngeal obstruction play an auxiliary rôle in stammering.

In what manner does the enlarged thymus tend to produce stammering? The answer is: By a reflex inhibition of the ordinary respiratory rhythm. A close analogy is furnished by the occurrence of asthma as a sequence of chronic nose and throat troubles, and more particularly of thymic asthma.

The therapeutic test furnishes the final argument in support of Browning's ingenious hypothesis. It has been well established that the *x*-rays cause a fibrosis of the thymus without completely destroying its glandular tissue. In the author's cases there was a progressive diminution in the area of thymic dullness under *x*-ray treatment and a concomitant improvement in or disappearance of the stammering. The application of the *x*-rays demands special skill. From two to four treatments should be given at intervals of from five to fifteen days, after which there should be a pause of several weeks. Two applications may suffice in the milder cases. Accessory hygienic, systemic, and local treatment may also be necessary in the individual case.

INDEX.

Abscess, blind dental, 308
following tonsillectomy under local anesthesia, 332
meningitic suppurative extradural, of posterior fossa of skull after purulent tonsillitis, 333
of lung after tonsillectomy, 332
of tongue, 314
peritonsillar, death from hemorrhage following, 334
peritonsillar, radical treatment by tonsillectomy during acute stage of disease, 328
pharyngeal, a sequel to ear disease, 237
retropharyngeal, 317
temporal lobe, rupture into lateral ventricle with recovery, 240
Accommodation and refraction, 22
spectacles, 24
Acoustic nerve, indirect injury to, 249
trauma, 200
trauma and protection against occupational deafness, 199
tumor, reactions following healed case, 203
Adenitis, chronic cervical, and tonsils, 321
lachrymal, 95
tuberculous cervical, importance of faucial tonsil as portal of entrance, 320
Air tract, upper, cancer of, with special reference to treatment with radium, 347
tract, upper, effects of protein extracts from fruits and pollens on, 273
tract, upper, infections of, 277
Amblyopia, coffee, and its relations to general intoxication from roasted coffee products, 118
sympathetic, 146
toxic, 118
traumatic, following explosion of shells, psychology of, 159
Ameba, pyorrhea due to organisms other than, 309
Analgesia in intranasal surgery, technique of, 276
Anesthesia, local, abscess following tonsillectomy under, 332
local, in enucleations and exenterations of eyeball and orbit, 123
Anesthesia, nitrous-oxide-oxygen in tonsillectomy, 327
Angina, Vincent's, twenty-five cases successfully treated with sodium perborate, 340
Angioma, choroidal, 88
Angiosclerosis, retinal, and associated lesions, 165
Aniridia, anatomy and pathology of, 74
Anterior chamber, visible currents in, 9
Aphakia, congenital, 61
Aqueoplasty of Zorab operation for glaucoma, 139
Argyrosis of lachrymal sac, 93
Arsenobenzol, grave toxic lesions of uveal tract and cranial sensory nerves fol-

lowing therapeutic use of, 119
Arteria centralis retinae, congenital absence of, 96
Arteriosclerosis, ear symptoms in, 192
Arthritis, chronic infectious, nose, throat and accessory sinuses in etiology of, 289
relation to oral osteitis, 312
Atmospheric conditions, effect on upper respiratory tract, 263
Auditory neuritis, 245
Aural vertigo, 248
Auricle, disease of, causing facial paresis, 201
Auto-inoculation in treatment of mouth infections, 305

Bacillus tularense conjunctivitis, acute, 39
Bacteriology of eye, 39
Berger loupe, self-illuminated, 21
Birth injuries of eye, 139
Blennorrheic conjunctivitis, optochin in, 51
Blepharochalasis, 46
Blind soldiers, training for, 35
Blindness, exact definition of, 26
monocular, due to sinus obstruction, 172
night, in war, 156
red-green, after glaring by snow, 38
Blood counts in relation to vaccine therapy, study of, 305
pressure and glaucoma, 129
Bone, temporal, development in relation to endocranial complications, 204
Brain, vascular lesions of, and changes in visual fields, 108
Bright's disease, rupture of central artery in stem of optic nerve in, 104
Bronchi and trachea, 346
trachea and esophagus, diagnosis and removal of foreign bodies in, 346
Bronchus and esophagus, foreign bodies removed from, 335

Calcium salt in treatment of hay-fever, 277
Campimeter, new hand, 16
Cancer of nose and throat, early recognition of, 277
of upper air tract with special reference to treatment with radium, 347
Cancrum oris treated with neosalvarsan, 308
Carcinoma, total extirpation of trachea for, 346
Carcinosis of conjunctiva, diffuse epibulbar and palpebral, 52
Cataract, 61
extraction, delayed healing of wound and its proper treatment, 69
extraction, expulsive retrochoroidal hemorrhage following, 71
extraction in capsule after subluxation with capsule forceps, 68
extraction, new conjunctival flap incision in, 66
extraction, prevention of post-operative infections, 70
incision leaving undetached conjunctival flap with bridge of conjunctiva on temporal side, 67
method of artificial maturation allowing of early extraction, 62
operation, choice of, 63
operation, lid retractors for, 179
secondary, cutting forceps for, 183
senile, treatment of early stages, 72
Cellulitis, orbital, removal of eyes in, 125

Chiasm, acute retrobulbar neuritis localized in, 106
psammoma of, 106
Children, vocal apparatus in, 356
Cholesteatoma, case of numerous complications following, 237
Choroid, infiltration of by leukocytes in leukemia, 85
melanoma of, 86
pre-retinal sarcoma of, 89
triple rupture of with iridodialysis, 144
Choroidal angioma, 88
Choroiditis, metastatic, 164
pneumococcus, acute primary, 85
Ciliary body, fibro-adenoma of, 86
processes in pupillary area, 77
Cocaine solutions injured by boiling, 184
Coffee amblyopia and its relations to general intoxication from roasted coffee products, 118
Colloidal theory of pathology of glaucoma, 131
Collosol argentum, 184
Color vision, 38
Congenital aphakia, 61
Conjunctiva, bulbar, tuberculosis of, 48
diffuse epibulbar and palpebral carcinosis of, 52
diseases of, 48
palpebral, grain of rice in, 48
sarcoma of, 53
Conjunctival tumor composed of Russell's corpuscles, 52
Conjunctivitis, acute bacillus tularense, 39
blennorrheic, optochin in, 51
Conservation of vision, 27
of vision, work of committee of Council on Health and Public Instruction, American Medical Association, 28
Copper in vitreous, 142
Cord perimeter, 10
Cornea and sclera, diseases of, 53
bilateral symmetrical degeneration of, 55
pigmentation of, 55
Corneal fistula, treatment of, 60
Cortical area for macular vision demonstrated by lesions in occipital lobes, 108
Crystalline Lens: See Lens
Currents, visible, in anterior chamber, 9
Curtain, tangent, 11
Cysts, thyroglossal, 337

Dacryocystitis, orbital phlegmon with atrophy and pigmentation of optic nerve after, 94
Toti's operation for, 176
Deafness, chronic, 195
occupational, protection against, 199
Dental abscess, blind, 308
Dermoid of pharynx, 318
Dextrohyoscyamine, mydriatic action of, 19
Diabetes mellitus, clinical investigations concerning affections of internal ear in, 243
Diabetic retinitis, 168
Digestive tract, diseases of, ear symptoms in, 192
Diphtheretic vulvo-vaginitis, paresis of accommodation after, 170
Diphtheria, 341
endotoxin in persistent diphtheria infection, 341
toxin test, intradermic, 341
Disc, hole in, associated with vibration of overlying membrane, 96
opaque nerve fibers in and pigmentation of, 105
Diverticulum, pulsion, of esophagus, new operation for its cure, 336

Drainage, intranasal, of lachrymal sac, 177
retained silk thread or Seton, for relief of glaucoma, 138
Drum movement, respiratory, 204
Duct, thyroglossal, 347

Ear, concerning receptive end-organ of, 248
disease, pharyngeal abscess a sequel to, 237
diseases of, 191
external and middle, radium in diseases of, 205
in rachitis, pathologic-anatomic characteristics of, 202
infection with Vincent's microörganism, 201
internal, in diabetes mellitus, clinical investigations concerning affections of, 243
middle, 204
middle, and Eustachian tube, 205
relation to general medicine, 191
Ears, conservation of, 207
Economics and hygiene of eye, 26
Edema, angioneurotic, of esophagus, 336
Emetine treatment of pyorrhea alveolaris, 312
Empyema of nasal accessory sinuses, 298
Endocarditis, acute, tonsillectomy during, 329
Enucleation, 121
in hemophilia, 124
versus exenteration, 121
Entamebas in tonsil, 325
Entamebic pyorrhea, constitution disturbances with, 310
Entamoeba buccalis and alveolodental pyorrhea, 310
Epibulbar epithelioma, removal of with radium bromide, 129
tuberculosis, 57
Epistaxis of syphilitic origin, interesting case of, 261
Epithelioma, epibulbar, removal of with radium bromide, 129
Erysipelas, case of severe pharyngitis in association with, 316
Esophago-tracheal fistula, report of case, 346
Esophagus, 335
and bronchus, foreign bodies removed from, 335
angioneurotic edema of, 336
diseases of, studied by aid of esophagoscope, 336
pulsion diverticulum of, new operation for its cure, 336
trachea and bronchi, diagnosis and removal of foreign bodies in, 346
unusual case of perforated ulcer of, 336
Ethmoiditis and tooth-root abscess in association with homonymous crescentic scotomas, 171
treatment of, 297
Eustachian tube and middle ear, 205
Exenteration versus enucleation, 121
Eye, action of thorium-X on, 184
and polycythemia, 170
bacteriology of, 39
birth injuries of, 139
chronic sporotrichosis of, 41
diseases, 9
diseases of, iodine in, 186
effect of tuberculosis of hypophysis on, 107
examination of, 9
examination of, mydriatic action of dextrohyoscyamine, 19
hygiene and economics of, 26
injuries of, 139
injury to from bursting golf ball, 139
lesions, organic, and localized headaches, relation to intranasal accessory sinus diseases, 302
military surgery of, 148

penetrating injury to from broken spectacle glass, 140
shell injuries to in warfare, 153
speculum, new, 181
symptoms in Kaposi's disease, 164
wounds in war, 152
Eyeball and orbit, 121
and orbit, local anesthesia in enucleations and exenterations of, 123
complete loss of, indemnity for, 34
penetration by fishhook followed by purulent meningitis, 142
removal of, fat implantation in, 122
Eyelids, diseases of, 42
Eyes, removal of in presence of orbital cellulitis, 125

Fat implantation after removal of eyeball, 122
Fibro-adenoma of ciliary body, 86
Fibroma, hard, or fibrocarcinoma of base of skull, operative treatment of, 261
Fish bones, hiding place in throat, 316
Fistula, corneal, treatment of, 60
esophago-tracheal, report of case, 346
symptom in congenital lues on pronouncing letters "M" and "N", 236
Football, neglect of injuries from, 262
Forceps, cutting, for secondary cataract, 183

Ganglion, sphenopalatine, injection of in commoner diseases of nose, 271
General diseases and ocular symptoms, 163
Glands, tuberculous, 337
Glasses, shooting, 24
some historical data concerning, 22
Glaucoma, 129
acute attack of, following instillation of holocain and zinc, 187
and blood-pressure, 129
aqueoplasty or Zorab operation for, 139
colloidal theory of pathology of, 131
leech-bite incision for, 131
limbal puncture in, 132
retained silk thread or Seton drainage for relief of, 138
sclerectomia ab externo in, 133
sclero-corneal Seton in treatment of, 135
Glossitis, acute, 313
parenchymatous, following submucous resection of septum, 313
Golf ball, bursting, injury to eye from, 139
Gono-blennorrhea, treatment of, 51
Gonorrhea and inflammation of uveal tract, 80

Hay-fever, 277
cause and prevention, 278
pollen extracts and vaccines in, 279
treatment with calcium salt, 277
Headache associated with intranasal disorders, 259
Headaches, localized, and some organic eye lesions, relation to intranasal accessory sinus diseases, 302
Hemianopic disturbances of visual field after gunshot injuries of skull, 157, 158
Hemianopsia, traumatic double, with partial recovery, 155
Hemophilia, enucleation in, 124
Hemorrhage, death from, following peritonsillar abscess, 334
expulsive retrochoroidal, fol-

lowing cataract extraction, 71
retinal, 167
Heterophoria and false heterophoria, 119
Holocain and zinc, acute attack of glaucoma following instillation of, 187
Hygiene and economics of eye, 26
Hypophyseal growth operated on through nose and sphenoid, 267
Hypophysis, tuberculosis of, effect on eye, 107

Indemnity for complete loss of eyeball, 34
Inferior turbinate, 276
Inflammation of accessory sinuses of nose, conservative treatment of, 299
Influenza and invasion of middle ear, 194
and otitis media, 211
otitis, mastoid disease, leukemic otitis, 213
Injuries of eye, 139
Insanity, post-operative, in ophthalmic cases, 73
Instruments, ophthalmic, new, 178
Intestinal auto-intoxication and inflammation of uveal tract, 80
Intranasal disorders, headache associated with, 259
surgery, technique of analgesia in, 276
Iodine in diseases of eye, 186
in treatment of pyorrhea alveolaris, 311
Iridodialysis and triple rupture of choroid, 144
Iritis, caused by pyorrhea, 84
chronic prostatitis a probable factor in, 82

Kaolin, use of to remove bacteria from throat and nose, 273
Kaposi's disease, eye symptoms in, 164
Katral and Punktal lenses, 25
Keratitis, bilateral, central, punctiform, subepithelial nodular, case of, 54
parenchymatous, Palladin reaction in, 53
punctata leprosa, 56
Keratosis nigricans, 45

Labyrinth, effect of loud noises on, 250
Labyrinthine involvement resulting from infections in mouth or throat, 252
Lachrymal adenitis, 95
apparatus, diseases of, 91
canaliculi, suture of, 91
concretions, 92
sac, argyrosis of, 93
sac, simple intranasal drainage of, 177
Laryngeal tuberculosis, 351
Laryngitis, chronic, treatment of, 347
Laryngoscopy, suspension, and its accomplishments, 352
Larynx, 347
congenital diaphragm of, 349
papilloma of, 350
prolapse of ventricle of, 351
Leech-bite incision for glaucoma, 131
Lens, crystalline, 61
dislocated, successful method for removal of, 61
normal, protection against harmful effect of ultraviolet light, 37
Lenses, Punktal and Katral, 25
wide-aperture, 25
Leprosy of cornea, 56
Leukemia, infiltration of choroid by leukocytes in, 85
Leukemic otitis, 213
Leukoplakia buccalis lingualis, 315
Lid everter, new, 178
retractors for cataract operation, 179
Lids, vitiligo of and poliosis after contusion, 141
Limbal puncture in glaucoma, 132

Lingual tonsillitis, 325
Lues, congenital, fistula symptom on pronouncing letters "M" and "N", 236
Lung, abscess of, after tonsillectomy, 332
suppuration after tonsillectomy, 333
Lymphoid infiltration of orbit, 127

Mastoid and sinus involvement, 216
disease, 213, 216
infant, operation, new retractor for, 179
operation, end results of, 223
Mastoiditis, acute, 220
hemorrhagic, 222
permeating, 221
Maxillary Antrum: See Sinus, Maxillary
Megalocornea, 53
Melanoma of choroid, 86
Meningitic suppurative extradural abscess of posterior fossa of skull after purulent tonsillitis, 333
Meningitis, otogenic, 241
purulent, following penetration of eyeball by fishhook, 142
Mercury in treatment of pyorrhea alveolaris, 311
Midwife versus physician in ophthalmia neonatorum, 33
Military surgery of eye, 148
Milk-borne septic sore throat, 339
Monkeys, condition of eyes made artificially myopic, 22
Mouth, 305
or throat infections, labyrinthine involvement resulting from, 252
hygiene, 306
infections, auto-inoculation in treatment of, 305
Mumps, involvement of middle ear in, 194
Muscles, ocular, 119
Mycosis fungoides, 40
Mydriatic action of dextrohyoscyamine, 19
Myopia, artificial, in eyes of monkeys, 22

Nasal deformities, depressed, resulting from submucous operations, 279
reflexes and neuroses, 260
Nasolachrymal disease, notes on case of, 284
Neosalvarsan in treatment of cancrum oris, 308
Nerve, acoustic, indirect injury to, 249
blocking, injection of sphenopalatine ganglion in commoner diseases of nose, 271
fibers, opaque, and pigmentation of disc, 105
optic, and retina, 96
optic, congenital division at base of skull, 104
optic, rupture of central artery in stem of, in Bright's disease, 104
optic, vascular lesions of, and changes in visual fields, 108
Nerves, cranial sensory, and uveal tract, toxic lesions of, following therapeutic use of arsenobenzol, 119
Nervous symptoms after ocular contusions, 146
system, diseases of, ear symptoms in, 192
Neuralgia, trifacial, from nasal and accessory sinus disease, 285
Neuritis, acute retrobulbar and multiple sclerosis, 168
acute retrobulbar, localized in chiasm, 106
auditory, 245
optic, bilateral, due to sphenoidal sinusitis, 172
pseudo-optic, 106
Neuroses and nasal reflexes, 260
Night blindness in war, 156

Nitrous-oxid-oxygen anesthesia in tonsillectomy, 327
Noises, loud, effect on labyrinth, 250
Nose and throat, cancer of, early recognition of, 277
and throat diseases, relation to general practice of medicine, 260
and throat operations, scopolamine in, 274
and throat, use of kaolin to remove bacteria from, 273
commoner diseases of, nerve blocking, injection of sphenopalatine ganglion, 271
throat and accessory sinuses in etiology of chronic infectious arthritis, 289
diseases of, 259
histologic pathology of, 262
neglect of injuries from football, 262

Occipital lobes, lesions in, demonstrating cortical area for macular vision, 108
region, shrapnel wound of with involvement of visual centers, 148
Ocular contusions, nervous symptoms after, 146
disturbances of neighboring sinuses, 172
disturbances, reflex, due to impacted third molars, 171
muscles, 119
parasites, 39
symptoms and general diseases, 163
therapeutics, 183
tissues, systemic diseases affecting, 163
tuberculosis, present status of tuberculin therapy in, 185
Oculo-motor paralysis of otitic origin, 119
Ophthalmia neonatorum, physician versus midwife in, 33
sympathetic, 145
Ophthalmic cases, post-operative insanity in, 73
instruments, new, 178
practice, Wassermann reaction in, 10
Ophthalmomyasis, 41
Optic nerve and retina, 96
nerve, congenital division at base of skull, 104
nerve, rupture of central artery in stem of, in Bright's disease, 104
nerves, vascular lesions of, and changes in visual fields, 108
neuritis, bilateral, due to sphenoidal sinusitis, 172
Optochin in blennorrheic conjunctivitis, 51
Oral osteitis in its relation to arthritis, 312
Orbit and eyeball, 121
and eyeball, local anesthesia in enucleations and exenterations of, 123
bony tumors of, diagnosis and treatment of, 128
lymphoid infiltration of, 127
Orbital cellulitis, removal of eyes in, 125
phlegmon with atrophy and pigmentation of optic nerve after dacryocystitis, 94
tumors, 127
Osteitis, oral, in its relation to arthritis, 312
Osteoma of frontal sinus, 304
Otitis, influenza, 213
leukemic, 213
media, 210
media, acute suppurative, due to streptococcus mucosus, 210
media, acute, treatment, 214
media and influenza, 211
media, cause of one ear being attacked before other, 212
media, complications and sequels of, 236
media, dyscrasic, 210
Otogenic meningitis, 241

Otosclerosis, pathogenesis and therapy of, 244
Ozena, etiology and treatment of, 268

Palate, soft, and uvula in tonsillectomies, 335
Palladin reaction in parenchymatous keratitis, 53
Palpebral syphilis, 42
Papilloma of larynx, 350
Paralysis, oculo-motor, of otitic origin, 119
Paresis, facial, following disease of auricle, 201
of accommodation after diphtheretic vulvo-vaginitis, 170
Parasites, ocular, 39
Pediatrics, proper position of tonsillectomy in, 328
Perimeter, cord, 10
Petit, diplobacillus liquefaciens of, 39
Pharyngeal abscess a sequel to ear disease, 237
stenosis, 317
Pharyngitis, severe, in association with erysipelas, 316
Pharynx, 316
dermoid of, 318
Physician versus midwife in ophthalmia neonatorum, 33
Pigmentation of cornea, 55
Plastoscope, simple, 19
Pneumococcus choroiditis, acute primary, 85
ulcer, treatment of, 59
Poliosis and vitiligo of lids after contusion, 141
Pollen extracts and vaccines in hay-fever, 279
Polycythemia and eye, 170
Potassium chloride, subconjunctival injections of in chronic diseases of uvea, 90
Pregnancy and catarrh of middle ear, 193
retinitis of, 98
Prism test, Wilbrand, modification of, 11
Prostatitis, chronic, a probable factor in iritis, 82
Protein extracts from fruits and pollens, effects on upper air tract, 273
Psammoma of chiasm, 106
Punktal and Katral lenses, 25
Pupillary area, ciliary processes in, 77
phenomenon, 76
Pupils in man, slit, 74
Pyorrhea alveolaris and inflammation of uveal tract, 79
alveolaris, recent investigations regarding etiology of, 309
alveolaris treated with emetine, 312
alveolaris treated with mercury, 311
alveolaris, treatment with iodine, 311
alveolo-dental, and entamoeba buccalis, 310
as a cause of iritis, 84
due to organisms other than ameba, 309
entamebic, constitution disturbances with, 310

Quinine or salicylic acid, effect on spiral ganglion, 254

Rachitis, pathologic-anatomic characteristics of ear in, 202
Radiotherapy and intra-ocular tumor, 89
Radium bromide, removal of epibulbar epithelioma with, 129
in external and middle ear disease, 205
in rhinoscleroma, 267
in treatment of cancer of upper air tract, 347
Reaction, Shick, 342
Refraction and accommodation, 22
vertex, 23
Resection, submucous, 281, 283
Respiratory diseases, vaccines in, 272
drum movement, 204
tract, upper, effect of vari-

ous atmospheric conditions on, 263
Retina and optic nerve, 96
detachment of, 100
detachment of, surgical treatment, 101
primary tuberculosis of, 97
Retinal angiosclerosis and associated lesions, 165
hemorrhages, 167
vessels, changes in, prognostic significance of, 166
Retinitis, diabetic, 168
of pregnancy, 98
pigmentosa treated by trephining, 99
punctata albescens, pigmented, 97
Retractor, new, for extirpation of tear sac operation, exterior frontal sinus operation and infant mastoid operation, 179
Rhinoscleroma, radium in, 267
Roentgenology of accessory nasal sinuses, 300

Saddle-nose, correction of, 266
Salicylic acid or quinine, effect on spiral ganglion, 254
Sarcoma of conjunctiva, 53
pre-retinal, of choroid, 89
Scarlet fever in etiology of ear diseases, 193
Sclera and cornea, diseases of, 53
Sclerectomia ab externo in glaucoma, 133
Sclero-corneal Seton in treatment of glaucoma, 135
trephining, 134
Sclerosis, multiple, and acute retrobulbar neuritis, 168
Sclerostomy, tragedy of, 135
Scopolamine in throat and nose operations, 274
Scotomas, homonymous crescentic, in association with ethmoiditis and tooth-root abscess, 171
Septum, 262, 279
after-treatment of submucous resection without use of splints, 283
perforation of, 280
reconstruction of, 279
some points on submucous resection of, 283
submucous resection, 281
submucous resection, parenchymatous glossitis following, 313
Seton or retained silk thread drainage in relief of glaucoma, 138
sclero-corneal, in treatment of glaucoma, 135
Shick reaction, 342
Shooting glasses, 24
Singers, some common voice troubles in, 354
tonsil operations in, 330
Singing voice, defects due to nasal and accessory sinus disease, 353
Sinusitis, frontal, treatment of 296
sphenoidal, bilateral optic neuritis due to, 172
suppurative, intranasal operation for, 295
Sinus and mastoid involvement, 216
disease, chronic, ultimate results of operations for, 285
exterior frontal, operation, new retractor for, 179
frontal, osteoma of, 304
frontal, suppuration, prenasal operation by anterior route, 294
frontal, suppuration with results of new operative procedure, 286
frontal, tuberculosis of, 303
maxillary, disease, operation of choice in, 298
maxillary, note on tumor of, 288
maxillary, results of ninety consecutive operations on, 301
nasal and accessory, disease, defects of singing voice due to, 353

Sporotrichosis of eye, chronic, 41
Stammering and its relation to enlarged thymus, 356
Stenosis, pharyngeal, 317
Strain, vocal, from laryngologist's standpoint, causes and prevention, 353
Streptococcus hemolyticus in sinus thrombosis, 233
mucosus causing acute suppurative otitis media, 210
sore throat, early diagnosis and effect of vaccines in treatment, 339
Submucous resection, 281, 283
Surgery, military, of eye, 148
Synchisis scintillans, 90
Syphilis, palpebral, 42
Syphilitic origin in case of epistaxis, 261
Systemic diseases affecting ocular tissues, 163

Tangent curtain, 11
Tarsorrhapy, 47
Tear sac, extirpation, new retractor for, 179
Teeth as foci of infection, 306
Temporal bone, development in relation to endocranial complications, 204
lobe abscess, rupture into lateral ventricle with recovery, 240
Test, intradermic diphtheria toxin, 341
objects, new, for scientific demonstration of visual acuity, 12
Wilbrand prism, modification of, 11
Therapeutics, ocular, 183
Thorium-X, action of on eye, 184
Throat and nose, cancer of, early recognition of, 277
and nose operations, scopolamine in, 274
and nose, use of kaolin to remove bacteria from, 273
diseases of, 305
nasal and accessory, disease, trifacial neuralgia from, 285
obstruction, monocular blindness due to, 172
spheno-ethmoidal, pathology and treatment of, 289
thrombosis, 225
thrombosis, diagnosis of, 230
thrombosis, septic, symptomatology of, 226
thrombosis, streptococcus hemolyticus in, 233
Sinuses, 284
accessory, histologic pathology of, 284
accessory, inflammatory conditions of, 295
accessory, throat and nose in etiology of chronic infectious arthritis, 289
nasal accessory, conservative treatment of inflammation of, 299
nasal accessory, empyema of, 298
nasal accessory, relation of localized headaches and some organic eye lesions to diseases of, 302
nasal accessory, Roentgenology of, 300
neighboring, ocular disturbances of, 172
x-ray examination of, 289
Snow blindness, 38
Sodium perborate in Vincent's angina, 340
Soldiers, blind, training for, 35
Spectacle frame for tennis players and farmers, 182
Spectacles, accommodation, 24
Speculum, eye, new, 181
Spheno-ethmoidal sinus, pathology and treatment of, 289
Sphenopalatine ganglion, injection of in commoner diseases of nose, 271
Spiral ganglion, effect of quinine or salicylic acid on, 254

hiding place for fish bones in, 316
nose and accessory sinuses in etiology of chronic infectious arthritis, 289
sore, milk-borne septic, 339
sore, streptococcus, early diagnosis and effect of vaccines in treatment, 339
Thrombosis, sinus, diagnosis of, 230
sinus, septic, 225
sinus, septic, symptomatology of, 226
sinus, streptococcus hemolyticus in, 233
Thymus, enlarged, relation of stammering to, 356
Thyroglossal cysts, 337
duct, 347
Tongue, 313
abscess of, 314
depressor, suction, 315
Tonometer, limitations of, 13
Tonsil, circumcision of, new instrument and technique for, 330
entamebas in, 325
faucial, importance as portal of entrance in tuberculous cervical adenitis, 320
instrument, new, 329
operations with especial reference to singers, 330
physiologic function of, 319
question, some phases of, 319
Tonsillar fossae, post-operative antiseptic treatment of, 335
infection in etiology of chronic infectious arthritis, 290
Tonsillectomy, 326
abscess of lung after, 332
during acute endocarditis, 329
forward inclined sitting posture under nitrous-oxide-oxygen anesthesia and other new features, 327
in peritonsillar abscess, 328
lung suppuration after, 333
proper position in pediatrics, 328
Tonsillitis, chronic, 326
lingual, 325
purulent, meningitic suppurative extradural abscess of posterior fossa of skull after, 333
Tonsils, 319
and chronic cervical adenitis, 321
conservative treatment of, 327
in relation to systemic diseases, 323
observations on, 319
some generally unrecognized points in anatomy of, 320
some infections of, 324
Tooth, reflex ocular disturbances due to impacted third molars, 171
root abscess and ethmoiditis in association with homonymous crescentic scotomas, 171
Toti's operation for dacryocystitis, 176
Trachea and bronchi, 346
bronchi and esophagus, diagnosis and removal of foreign bodies in, 346
position in tuberculosis, 346
total extirpation of for carcinoma, 346
Trachoma and its treatment, 49
Trephining in retinitis pigmentosa, 99
sclero-corneal, 134
Tubercle bacilli in middle ear, 194
Tuberculin therapy in ocular tuberculosis, present status of, 185
Tuberculosis, epibulbar, 57
laryngeal, 351
ocular, present status of tuberculin therapy in, 185
of bulbar conjunctiva, 48
of frontal sinus, 303
of hypophysis, effect on eye, 107
position of trachea in, 346
primary, of retina, 97

Vertigo, aural, 248
Vestibular findings in wound of frontal lobe, 244
Vincent's angina, twenty-five cases successfully treated with sodium perborate, 340
microörganism, infection of ear with, 201
Vision, color, 38
conservation of, 27
macular, lesions in occipital lobes demonstrating cortical area for, 108
Visual acuity, new test objects for scientific demonstration of, 12
centers, cortical, destruction by rifle bullet, 159
centers, involvement of in shrapnel wound of occipital region, 148
field, hemianopic disturbances of after gunshot injuries of skull, 157, 158
field, improved hatpin for measuring, 18
fields, unusual changes in due to vascular lesions in brain and optic nerves, 108
Vitiligo of lids and poliosis after contusion, 141
Vitreous and uveal tract, diseases of, 74
birdshot removed from through pupil, 143
copper in, 142
Vocal apparatus in children, 356
strain from laryngologist's standpoint, causes and prevention, 353
Voice, singing, defects due to nasal and accessory sinus disease, 353
troubles in singers, common, 354
Vulvo-vaginitis, diphtheretic, paresis of accommodation after, 170

War, eye wounds in, 152
night blindness in, 156
shell injuries to eye in, 153
Tuberculous cervical adenitis, importance of faucial tonsil as portal of entrance, 320
glands, non-surgical treatment, 337
Tumor, acoustic, reactions following healed case, 203
conjunctival, composed of Russell's corpuscles, 52
intraocular, and radiotherapy, 89
of maxillary antrum, notes on, 288
Tumors, bony, of orbit, diagnosis and treatment of, 128
orbital, 127
Turbinate, inferior, 276
Typhoid fever, ear involvement in, 194

Ulcer, perforated, of esophagus, unusual case of, 336
pneumococcus, treatment of, 59
Ultra-violet light, protection of normal lens against harmful effect of, 37
Uterine disease and inflammation of uveal tract, 81
Uvea, chronic diseases of, subconjunctival injections of potassium chloride in, 90
Uveal tract and cranial sensory nerves, toxic lesions of following therapeutic use of arsenobenzol, 119
tract and vitreous, diseases of, 74
tract, inflammation of secondary to infection of mucous membranes, 78
Uvula and soft palate, injuries to in tonsillectomies, 335

Vaccine therapy, blood counts in relation to, 305
Vaccines and pollen extracts in hay-fever, 279
in respiratory diseases, 272
in treatment of streptococcus sore throat, 339
Vertex-refraction, 23

Wassermann reaction in ophthalmic practice, 10
Wilbrand prism test, modification of, 11

X-ray examination of sinuses, 289

Zinc and holocain, acute attack of glaucoma following instillation of, 187
Zorab operation or aqueoplasty for glaucoma, 139

INDEX TO AUTHORS.

Abelsdorf, G., 184
Adair, 312
Alger, E. M., 34
Alter, F. W., 42, 330
Appleman, L. F., 144
Arganaraz, R., 119
Arrowsmith, H., 336
Ascher, J., 170
Auersbach, C., 319
Axenfeld, T., 56, 158

Babbitt, J. A., 279
Bader, A., 90
Ballard, C. H., 289
Ballin, M. J., 233
Barany, 203
Barnes, H. A., 328
Barrett, M. T., 325
Beaumont, W. M., 84
Beck, 244
Beck, J. C., 262, 284, 285
Beck, O., 210
Bedell, A. J., 41
Berg, F., 9, 89
Best, F., 156
Beth, L., 41
Biggs, H. M., 339
Bird, U. S., 76
Blatt, 345
Blue, J. B., 283
Blum, S., 328
Boyd, E. T., 45
Boyle, C. C., 165
Bradburne, A. A., 172
Bramwell, B., 108
Brawley, F., 163
Broder, C. B., 352
Brophy, J. A., 172
Browning, W., 356
Bruecken, A. J., 86
Brunelle, 310
Bundesen, H. M., 342
Burge, E., 37
Burke, C. B., 337
Butler, T. H., 135

Calhoun, P., 106
Carmody, 334
Carter, W. W., 279
Cavanaugh, J. A., 276
Cecil, R. L., 277
Chapman, V. A., 304
Chappell, W. F., 273
Christel, P., 53
Christie, G. W., 336
Cirincione, 74
Clapp, C. A., 77
Clegg, J. G., 62, 85
Coats, G., 127
Cocks, G. H., 263
Collins, T., 129
Coulter, C. F., 205
Cox, C. N., 191
Crane, C. G., 207
Cross, F. R., 164
Curtin, T. H., 102

Daniëls, C. E., 183
Darier, 152
Darling, B. C., 312
Davis, A. E., 101
Dean, L. W., 164
Delavan, D. B., 262
Denker, 244
Denman, 327
Dernehl, P. H., 82
DeSanctis, A. G., 308
de Schweinitz, G. E., 171

Deutschmann, R., 89
Diem, M., 97
Duane, A., 11
Dutrow, H. V., 171

Edgar, 243
Eirner, E., 266
Eitelberg, 213
Elliot, R. H., 139
Ellis, 346
Elschnig, A., 47, 91
Evans, J. S., 310
Everard, E. W. E., 27
Ewing, A. E., 66

Finkelstone, 346
Finnoff, 334
Fischer, L., 326
Fisher, 281
Fisher, J. H., 98
Fisk, E. L., 306
Foroni, S., 133
Forster, 346
Fox, L. W., 50
Frank, I., 279
Fraser, J. S., 335
Freudenthal, W., 259, 347

Gamble, W. E., 57
Gardiner, H., 321
Gaub, 336
Gifford, H., 182
Gilbert, 346
Ginsberg, 310
Ginsberg, G., 344
Gjessing, H., 187
Goerdt, 240
Gotteberg, M., 200
Goulden, C., 78
Gradle, H., 121, 122, 124
Graef, C., 344
Graham, H. B., 230
Grant, J. D., 316
Green, J., jr., 124
Green, A. S., 181, 183
Green, L. D., 181, 183
Greene, J. B., 351
Grimsdale, H. B., 26
Guttman, J., 267

Haberman, 199
Hagen, S., 88
Hall, G. G., 225
Hallarman, H., 317
Halle, M., 295
Hammond, R., 289
Hardy, W. F., 61
Hare, J. H., 35
Harper, J., 340
Harrison, W. G., 329
Hartzell, T. B., 309
Hays, H., 211
Head, J., 305
Heiman, H., 233
Heinrichsdorff, P., 107
Heitger, J. D., 320
Hektoen, 273
Helfrich, C. H., 62
Henrich, A. T., 309
Herzfeld, 204
Hewlett, R. T., 341
Heybroek, N. J., 107
Higgins, 318
Hill, E., 22
Hinnen, G. A., 261
Hinsberg, 255
Holding, A. F., 337
Holloway, T. B., 96
Holth, S., 10, 103
Horn, H., 268
Hoxie, G. H., 309
Hubbard, T., 350
Hudson-Makuen, G., 327
Ibershoff, A. E., 172

Inman, W. S., 139

Israel, S., 178
Jackson, 336
Jackson, E., 165
James, R. R., 100
Jeffrey, E., 95
Jess, A., 145
Jobson, G. B., 285

Kahn, A., 284
Kern, 24
Kerry, R., 186
Keutel, J., 146
Kleipool, C. M., 40
Knapp, A., 68, 166
Koerner, 201
Komendantow, 202
Komoto, G., 52
Koyanagi, Y., 85
Kremer, F. B., 306

Krückmann, E., 24
Kuhnt, H., 60

Lauber, H., 24
Lent, M. F., 351
Lerche, W., 336
Levinsohn, G., 22
Levinson, 345
Levy, R., 315
Lewis, H. C. B., 298
Libby, F., 49
Lindner, K., 70
Lister, W. T., 125
Livingstone, P. J., 302
Lloyd, R. I., 96
Loeb, H. W., 222
Lohmann, W., 38
Lothrop, H. A., 286
Lynch, C. F., 342
Lynch, R. C., 353

Mackie, T. J., 10
MacRae, A., 129
Maddox, E., 18, 63, 119
Manges, M., 332
Manson, W. H., 10
Marquis, G. P., 298, 335
Matthews, J., 326
Maxted, G., 92
Maybaum, J. L., 299
Mayer, 237
Mayer, E., 277
Mayou, M. S., 100
McBurney, M., 52
McCaw, J. A., 131
McCullagh, S., 297
McCurry, J. M., 352
McKenney, A., 319
McKenzie, D., 237
McKesson, 327
McLeod, J., 260
McLoone, J. J., 353
McNaught, H., 301
Mellon, R. R., 339
Metzenbaum, M., 274
Middleton, W. S., 310
Milligan, W., 283
Milner, C. E. H., 155
Mink, P. J., 289
Mollison, W. M., 220
Moody, E. E., 341
Moore, R. F., 86
Moorehead, R. L., 346
Muckleston, H. S., 316
Mulholland, J. A., 201
Murphy, F. G., 330
Mygind, 241

Neil, A. J., 37
Neuenborn, R., 262
New, G. B., 349, 351

Ohm, J., 102
Ormond, A. W., 153
Otori, K., 97

Paine, H. S., 61
Pálich-Szánto, O., 105
Pape, R., 170
Parker, 323
Parrish, H., 260
Parsons, J. G., 325
Parsons, J. H., 38, 159
Peck, O., 333
Pegler, L. H., 259
Penichet, J. M., 48
Perlmann, A., 34
Peter, L. C., 16
Peterson, A., 309
Pfingst, A. O., 73
Pfingsten, C. F., 226
Pierce, C. H., 205
Pike, J. B., 221
Pischel, K., 143
Pollock, H. L., 271
Posey, W. C., 108
Poynton, 318
Pratt, J. A., 177
Prentice, C. F., 23, 25
Puscarin, E., 51
Pybus, F. C., 324

Quackenbos, A., 134

Raia, V. L., 176
Ramsay, M., 59
Rappaport, 273
Raynor, F. C., 313
Roe, A. L., 184
Roger, T. R., 250
Rönne, H., 106
Rossler, F., 94
Rowlette, 272
Ruttin, E., 236

Sanger, F. D., 319

Sattler, R., 39
Schanz, F., 26
Scheppergrell, W., 278
Schiötz, I., 103
Schroeder, 255
Seidel, E., 123
Shambaugh, G. E., 252
Shumway, E. A., 21
Siebenmann, 251
Siegrist, A., 51
Small, C. P., 139
Smith, C. H., 217
Smith, D. P., 132
Smith, H., 72
Smith, H. E., 10
Smith, P., 14
Smith, S. M., 223
Snead, C. M., 104
Socca, 248
Soerensen, J., 346
Staehli, J., 53
Stark, H. H., 340
Starkey, H. M., 71
Stein, O. J., 267
Steindorff, K., 141
Stephenson, S., 140
Stieren, E., 46
Straub, M., 12
Strause, S., 279
Stumpf, 179
Stutz, 210
Summers, B. E., 313

Talbot, E. S., 311
Tamanscheff, C., 74
Tarle, J., 168
Taylor, F. E., 39
Taylor, H. N., 288
Terry, R. J., 19
Thomas, J. B., 303
Thompson, J. A., 335
Tiffany, F. B., 102
Titus, N. E., 315
Todd, F., 67, 131
Turner, A. L., 317

Uffenorde, W., 295, 296
Uhthoff, W., 54, 55, 157
Ulrich, H. L., 308
Urbantschitsch, V., 205

Vail, D. T., 69, 138, 179
Vanderhoof, D. A., 332
Veasey, C. E., 143
Velhagen, C., 104
Virden, J. E., 185
von Skramlik, E., 93
von Speyr, T., 142
Voorhees, J. W., 330, 354

Waardenburg, P. J., 55
Waddy, R. G., 159
Waldron, C. W., 300
Walker, C., 11
Walker, H., 195
Warbrick, J. C., 280
Watson, W., 276
Watson-Williams, P., 294
Webb, 346
Weidler, W. B., 185
Weinberg, 356
Welkinson, O., 214
Wells, W. A., 353
Wessler, H., 333
Westmacott, F. H., 120
Westpfahl, H. A., 90
White, J. V., 314
White, R. G., 312
Wiener, M., 19
Williams, E. R., 146
Willis, B. C., 320
Wilson, H., 277
Winkler, E., 296
Wintermute, G. P., 245
Wittmack, 204
Wolfe, C. T., 53
Wood, C. A., 118, 135, 139, 148
Wray, C., 128
Wright, B. L., 312

Yearsley, 212

Zange, 248, 249
Zoth, O., 19